

# Montana State University Design Guidelines



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## Introduction

The Montana State University Campus Design Guidelines is a living document established to guide consultants through all phases of project development. It serves to consolidate and organize the range of institutional knowledge retained by the Campus Planning, Design & Construction Department. It is intended to be updated every two years, although more current individual sections or supplements may be distributed or posted on an as-needed basis.

Compliance with the Campus Design Guidelines is an obligation of Design Consultants retained under the university standard consultant's agreement. Responsibility for any non-compliant design and/or resulting installation falls within the respective Design Consultant's scope of services. It is important that this document be reviewed, understood and any exceptions noted prior to entering into any such agreements. The Design Consultant is expected to comprehend all aspects of the standards, including document preparation and review guidelines covering requirements for all submissions from schematic design through closeout requirements. In addition, dissemination of all pertinent sections of this manual to sub-consultants or appropriate members of the Design Consultant's team is the responsibility of the lead consultant under contract.

Please note that this document is not distributed directly to contractors. Therefore, items herein identified as part of Contractor or Construction Manager responsibility will only become known when shown on consultant's contract documents. The Design Consultant documents are to include information pertinent to the Contractor's scope of work (such as As-Built information) so that the standards may be consistently applied. Therefore, the Design Consultants' document coordination effort must include those items in the Campus Design Guidelines that impact a contractor's or construction manager's ability to conform as well. This requires that consultants include all such contractor requirements from this manual in respective Construction Specification Institute (CSI) specification sections and/or drawings prior to document release.

The format for all sections contained in the Campus Design Guidelines is consistently presented for ease of use. In addition to design and review guidelines, each topic or section contains appropriate references, as well as an appendix of further informational references pertinent to the topic.

The information contained within the Campus Design Guidelines is not intended to limit design expression or material selections, but rather guide Design Consultants in ways to expedite project completion within acceptable MSU standards. Exceptions to any design standard herein shall be discussed and modified if the Design Consultant obtains written approval through the Project Manager. This process must be initiated through the Project Manager to assure proper notification and review, as well as to assure accurate and timely updates to the manual.



## Use of these Guidelines

The Montana State University Campus Design Guideline's intended goal is to provide Montana State University (MSU) and Design Consultants with a comprehensive campus standard for minimum design requirements for new and existing structures, and exterior open spaces. These guidelines are also intended to serve as a reference to many committees and advisory groups on campus in support of their charges regarding the built environment.

These Guidelines are organized from general to specific information, with Appendices including the most specific items. Each section includes a main body text accompanied with a written description of guideline objectives with a side bar including key points to be noted by the reader, additional reference material links, and example imagery. The Appendices to this document are intended to serve as an updatable standard and specification sections for items that may continue to develop or change to adapt to MSU's future needs.

MSU is committed to a current and comprehensive document that defines the process and minimum standards to guide future decision making based on current institutional knowledge and lessons-learned from past MSU projects. The Guidelines will serve to guide future planning for development on the MSU campuses.

This document is available online at [www.montana.edu/us/committees/ufpb/documents\\_guidelines.php](http://www.montana.edu/us/committees/ufpb/documents_guidelines.php), and in hard copy at the Campus Planning, Design and Construction Office. Items may change without notice. The user is responsible for verifying that they have the most recent copy of the guidelines.

Montana State University Campus Planning, Design & Construction wishes to express its thanks to Princeton University for its permission to utilize the Princeton University Design Standards manual as a model for this document.

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## 1.0 General Administrative

### 1.1 University Facilities Organization

This document is a basic reference for those involved in the design and construction of new buildings, the modification of existing structures and systems, and the renovation of existing spaces at Montana State University. MSU was founded in 1893 as the Agricultural College of the State of Montana, a land grant institution under the Morrill Acts of 1862 and 1890. From modest beginnings the college has grown to become MSU, comprised of over 15,000 students on over 900 acres of campus property in Bozeman as well as campuses in Billings, Great Falls and Havre, and eight experiment stations throughout the State.

A companion to the University's Long Range Campus Development Plan, this manual was developed as a resource for Design Consultants, Contractors, and Suppliers who provide services to the University. The manual is also intended to provide guidance for University Project Managers, administration, and support staff.

It is understood that the basic minimum requirements described within these Guidelines are in addition to the applicable university, local and national codes and requirements.

Each division of the manual contains guidelines that establish the standards for design as well as the quality of materials and work appropriate for university projects. These Guidelines are not intended to limit or exclude input from Design Consultants. To the contrary, Design Consultants are to offer alternative solutions and/or materials when there are quality, cost or time benefits that do not compromise the integrity of the work to be performed. It is recognized that there are inevitable design considerations that require special treatment. Moreover, it is intended that this manual be evolutionary, changing and allow revisions as technologies and methodologies change.

#### 1.1.1 Campus Planning Design & Construction

Campus Planning, Design & Construction (CPDC) is charged with the management of planning, design and construction efforts for new structures, renovations, major maintenance, and infrastructure projects for the University Facilities. CPDC consists of two functional elements, the Planning group and the Design & Construction group. Planning and Design & Construction work cooperatively to assist campus clients with the planning, design and approval processes involved in initiating and completing projects on campus.

Planning provides services that include long range campus and facilities planning, site assessments, space programming support and capital project planning. Planning is also responsible for oversight of the campus master plan, titled the Long Range Campus Development Plan (LRCDP, see Appendix 2.1).



Long Range Campus  
Development Plan  
See Appendix 2.1-1

Design & Construction is responsible for design, coordination and management of all construction projects on the MSU campus, both large and small. The university's long term interests in the quality and longevity of its buildings and infrastructure are safeguarded through the Campus Design and Construction Guidelines drafted and administered by the Design & Construction group.

As stewards of MSU's physical assets, CPDC's planners, designers and project managers are committed to approaches that enhance and preserve historic buildings, landscapes and cultural features. Carrying this stewardship into the future, CPDC focuses on a commitment to the pursuit of sustainable building and landscape designs, aware of the university's responsibility to be a model for not only its students but the larger community as well.

### **1.1.2 Definition of Project Roles**

All university new construction and renovation projects are managed through CPDC. Within CPDC, typically, design and construction projects under a value of \$75,000 are typically handled by a Project Designer or Project Architect, and projects with a value in excess of \$75,000 are typically handled by Project Managers. The Project Designer, Project Architect or Project Manager is the university's designated representative for the project. The University Architect will serve as a resource and provide oversight and input as appropriate on every project.

Certain new construction and renovation projects receiving funding through the State of Montana Legislature also have a State Project Manager. On these projects Consultants and Contractors are under contract directly to the State and the State Project Manager will be the primary decision maker regarding issues of budget and schedule. The University Project Manager will remain the primary contact for the University Client Representatives or Building Committee (see below).

The key project entities and their roles are as follows:

1. Project Manager—the university's designated representative responsible for the entire project process, from initiation to close-out management, of all university construction and renovation projects with a value in excess of \$75,000. Tasks and duties include management of: the MSU Client Representative(s);
2. Design Consultant selection; Design Consultant tasks such as programming, budgeting, site analysis, preparation of construction documents, document review, schedule, construction administration, and close-out; project bidding and contractor selection; contractor services during construction; and project close-out and warranty. A Project Designer or Project Architect will perform the same role on projects with a value under \$75,000.

3. Client Representative—the appointed agent of the client (University Department or Building Committee) who actively represents the Client during all phases of a project. The Client Representative provides a direct communication link between CPDC and the Client with regard to progress or decisions crucial to the project. The Client Representative and Project Manager function as a team to facilitate timely and effective interaction between CPDC and the Client. On some projects the Client role may be fulfilled by the full Building Committee.
4. Building Committee—when considered necessary to the project, a Building Committee will be established to help draft the building project program and budget and evaluate how well the project program objectives are met by the project design. The committee also is involved in the decision process when deviations from the project program or budget are required. The Project Manager will coordinate the efforts of the Building Committee.
5. Design Consultant—The external professional individual or organization(s), under contract to the university, that perform the design and prepare plans and specifications depicting the work to be done, provide cost estimates for the project, and provide contract administration services during the construction and warranty phases of the project. The Design Consultant may be an architect, an engineer, or an organization that combines these professional services depending on the scope and complexity of the project.
6. Contractor—The person or organization, under contract to the university, that undertakes responsibility for the performance of the construction work, in accordance with plans, specifications, and Contract Documents. The Contractor provides the labor, material, and equipment to accomplish the work. Subcontractor—A person or entity that has a direct contract with the Contractor to perform a particular part of the work on the project.
7. Supplier—A person or entity that supplies materials or equipment for the work, including that fabricated to a special design, but who does not perform labor at the site.

### **1.1.3 Facilities Services**

Facilities Services at MSU is the department charged with the maintenance and operation of all university buildings, grounds and infrastructure systems. Facilities Services comprises fifty six service management areas which include: Administrative and University Services, Environmental Services, Budget & IT, Campus Maintenance, Engineering & Utilities, and Campus Work Control. Facilities Services employs approximately 180 full time employees and supplements the permanent workforce with seasonal labor. Facilities Services works parallel to and closely in cooperation with Campus Planning, Design & Construction.

### 1.1.4 University Facilities Planning Board

The University Facilities Planning Board (UFPB) is the body that reviews and provides recommendations on all issues affecting the public realm of the university. As such, UFPB reviews all new building projects, renovation projects, and development or changes to the landscape and grounds of the University. UFPB serves in an advisory capacity to the University President. UFPB also develops, recommends and maintains policies related to the development and utilization of campus facilities and grounds. The board is comprised of members who represent a broad cross section of the university community. The board generally meets twice a month. For additional information on UFPB refer to the UFPB web site.

## 1.2 Campus Design Goals

The following information is a general discussion of MSU's goals for campus planning and design. This information is expanded upon in greater detail in later sections of this document, but this section serves to consolidate these planning and design goals into one central document.

### 1.2.1 Building Location and Design Goals

Generally follow the Long Range Campus Development Plan through the following:

1. Building Location
  - A. Protect and preserve the historic campus layout, spatial flow and architectural heritage.
  - B. Site buildings with the intention of expanding the network of clearly defined exterior spaces.
  - C. Locate buildings in close proximity to steam tunnel and infrastructure facilities.
  - D. Provide ADA-compliant access to all buildings and public spaces.

University Facilities  
Planning Board  
Website:  
[www.montana.edu/  
us/committees/ufpb](http://www.montana.edu/us/committees/ufpb)

Protect and preserve  
historic campus layout

Clearly defined  
exterior spaces



Buildings within the campus core must respect their immediate context

2. Building Design
  - A. Design buildings within the campus core to respect their immediate context in terms of existing buildings and infrastructure. Scale, massing, materials and fenestration of these buildings should respect existing buildings, especially when close to historic buildings.
    - The university desires that the design of construction, renovation and major maintenance projects consider the impacts and influence of such projects on historical elements of the campus, which can include buildings, landscape elements, pathways, sculpture, etc. Consideration of a structure's value as an historic element should include its authenticity, the economic viability of its continued existence, its structural integrity, its relationship to campus tradition, its prominence, how it is perceived by the campus community, alumni, and the surrounding community, etc. While it is understood that economic expediency will always be a factor, it is expressly desired that the preservation of historical elements not be subjugated to financial considerations as a matter of course. Consideration in the design of a project shall also be given as to the level of preservation an element may command. For example, if complete and accurate preservation is desirable, then repair and maintenance of the element's original materials may be required. If a significant element is structurally unsound, identical replacement may be considered. If adaptive reuse or an addition to an existing facility is planned, evaluate and identify significant elements that may command preservation or should be used to integrate a new addition. Examples:
      - i. The cupola for Montana Hall was replicated using modern materials but copied the size, shape and aesthetics of the original cupola.
      - ii. The window replacement on Lewis Hall, while energy efficient, is not sensitive to the original building design or fenestration.
      - iii. The vault added to Montana Hall is a good example of "what not to do" for an historically sensitive addition.
  2. Design buildings within the campus core to respect their immediate context in terms of existing buildings infrastructure. Scale, massing, materials and fenestration of these buildings should respect existing building especially when close to historic buildings.
    - A. New buildings shall be designed to permit future expansion and shall be capable of being adapted to new uses as the needs and priorities of the university change.
      - All new design projects should be adaptive and flexible for future growth of the campus. Where possible, expansion opportunities should be part of the original design planning so that growth of the building footprint is orderly. All new construction should be adaptable in design such that changing programs and users are easily accommodated in the future.



- B. Remodeling and/or addition projects must consider the entire building, not restricting initial examination only to a narrow project scope.
  - Elaboration: Renovation projects must be estimated and funded to include remediation of critical code violations. Perpetuation of code violations, when they could be remedied at reasonable cost with a project budget, is not appropriate. If a code problem must be remedied in order to accomplish a project, the project should bear the cost of the necessary fix, unless other readily available funds are identified.
- C. Design projects to be responsive to environmental impact and local climatic extremes.
  - Elaboration: Design elements that are attractive in other areas may not be economically viable when viewed in the context of long-term Operations and Maintenance (O&M). Response to MSU's setting with a local aesthetic for sense of place is desired. Create design elements which will protect people from ice and snow dangers and protect people from ice and snow slides from building roofs. Assure that all walks and building entries are safe distances from slide zones or that they are protected by porticos. Where possible design major walks and entries on the south sides of buildings to gain access to the sun.
- D. Develop projects with recognition for our ability to maintain the resulting facility, given a fundamental awareness of the institutional level of commitment to maintenance.
  - Elaboration: While each project should address its unique programmatic requirements and other unique qualities, O&M costs - while not the sole factor driving design decisions - must occupy a critical place in the planning and design of all projects. The level of design must reflect a corresponding level of maintenance - a level that we have a reasonable expectation will be met. Include consideration for the available level of grounds maintenance and snow removal for all exterior features.
- E. Consider life-cycle cost efficiency of buildings as a design parameter with regard to construction, process, materials selection, maintenance, and energy utilization.
  - Elaboration: Universities must construct facilities that are durable enough to provide the long service life expected by the institution, and these facilities must be maintained during that long life, in the face of steadily increasing labor, material and utility costs. O&M costs over the lifespan of a facility can approach 4-8 times the first cost of construction. Therefore, it is extremely important and appropriate that life-cycle considerations be made during the design phase.
- F. Plan for snow removal routes and snow storage areas in all new projects.
  - Elaboration: Seasonal heavy snowfall is expected at MSU. All new buildings, related parking areas, and walkways shall be planned with logical snow removal and snow storage contingencies shown on the plans. Appropriate clearance and set-backs from snow removal routes are required.



New cupola on  
Montana Hall

Design new buildings  
to permit future  
Design new buildings  
and remodelings  
to withstand local  
New construction  
must be designed to  
be maintainable  
Plan for snow removal



Design all projects to be fully accessible

Campus Noise Guidelines See Appendix 5.7-1

Preserve and enhance outdoor spaces

- G. Noise and fumes from building systems should not be allowed to intrude on adjacent interior or exterior public spaces.
- Elaboration: Noise-generating activities should be located within the building which should be designed to protect users in other buildings or in public open spaces. Buildings should not be permitted to emit unacceptably noxious or otherwise unpleasant fumes or gasses. Delivery vehicles and service loading areas should be planned so that vehicular fumes do not enter the building.
- H. Provide ADA-compliant access to all buildings and public spaces.
- Elaboration: In accordance with the Rehabilitation Act of 1974, no qualified handicapped person shall be denied the benefits of, be excluded from participation in, or be otherwise subjected to discrimination under any program or activity because a recipient's facilities are inaccessible or unusable. When applied to existing facilities (those existing before June 3, 1977), this regulation requires that activities operated in that facility must, when viewed in their entirety, be readily accessible. The standard does not require that every facility or every part of that facility be accessible, so long as the program as a whole is accessible. The regulation requires, however, that all new construction, as well as alterations which could affect access to and use of existing facilities, must be designed and constructed so as to make facilities accessible and usable by handicapped persons. Subsequent to the passage of the Americans With Disabilities Act in 1990, the ADA Accessibility Guidelines (ADAAG) for buildings and facilities became the standard for disability access compliance for non-government facilities and provided government facilities such as MSU with an alternative set of regulations to follow. Montana State University is committed to providing ADA compliant access to its facilities and encourages designers to exceed, where readily achievable, ADAAG and UFAS standards so that no barriers to access to any part of a facility are designed or constructed. In concert with decision-making regarding designated handicapped entrances/exits, a set of automatic doors must be provided for wheelchair users and others with mobility impairments. Serious planning consideration must be given to designing these doors in such a manner that overall visual effect "fits" with the entire building design/theme. These doors should not appear as simple "add-ons" to the building.
  - Elaboration: Montana's mountains and valleys represent one of our most important and "imageable" features. View corridors should be protected to the Bridgers, Hyalites, Tobacco Roots, Spanish Peaks and Sourdough Ridge.

## I. Circulation

- Create a recognizable and logical hierarchy of campus circulation with minimal conflicts for public vehicle, service vehicle, bicycle and pedestrian users such that:
  - i. Pedestrian patterns should be dominant.
    - Elaboration: The majority of intra-campus circulation is pedestrian or bicycle-oriented. Walking and the use of bicycles is to be encouraged over the use of automobiles within the campus by design and by policy. This policy is environmentally sound, consistent with the Montana outdoor lifestyle, and can enhance pedestrian safety. Connect all portions of the expanding campus by a hierarchy of pedestrian friendly walks and pathways. Avoid impediments to wheelchairs in paving design. Good design strives to produce a sense of harmony and beauty which is consistent with function and practicality. Interior pedestrian routes should link with exterior routes to provide logical connections through buildings. However, the continuity of exterior pedestrian routes should not be compromised when buildings are closed.
    - Within the campus, first priority should be given to the most vulnerable and desirable system of circulation, the pedestrian. On-campus use of alternate modes of personal transportation such as bicycles should also be encouraged, but a logical circulation system for these faster moving modes of human-powered transit will be required to avoid pedestrian conflicts. Access and egress to parking areas should be designed and/or modified where possible to avoid directing large numbers of automobiles onto campus streets which have heavy flows of pedestrian cross-traffic.
  - ii. Necessary service vehicle circulation in primary pedestrian sectors is on pedestrian-appearing lanes.
    - Elaboration: Access drives should penetrate academic blocks and provide access for service, pick-up and delivery, and trash removal. Because vehicles will use these routes only occasionally, the surface should project a pedestrian character in primarily pedestrian sectors. Major pedestrian paths within the pedestrian precinct will be required to accommodate emergency vehicles and very occasional service vehicles. The requirement for vehicles on these paths should not change their design image, which should clearly express their primary pedestrian function in pedestrian cores and not their occasional vehicular function.
  - iii. Minimize private vehicle use through design by encouraging car-pool, mass transit, bicycle and alternative modes of circulation.

Pedestrian patterns should be dominant

Service drive and delivery area



Minimize private  
vehicle use

Vehicle storage and  
circulation on campus  
perimeter

Clear access from  
parking areas to public  
buildings

Construction Impacts  
on Parking  
See Section 2.4.4  
See Appendix 2.4-2

- iv. Traffic speeds should be kept low.
  - Elaboration: Traffic calming measures should be considered along heavily used inner campus roads to reduce speeds and increase pedestrian safety. These could include: narrowed streets, rumble strip, and/or colored and textured cross zone delineation.
- v. Public vehicle circulation and storage are on the perimeter of campus. Construct parking facilities that are permanent, durable and maintainable; but accommodate the continued progression of parking surfaces based on level of use.
  - Elaboration: Permanent parking lots shall have concrete curb/gutter as edges, proper lighting, asphalt surfacing, be striped, have adequate signage, landscaping, irrigation systems, proper storm water retention areas, appropriate access walks, etc. Durable pavement requires proper structural base, adequate asphalt thickness, proper slope for run-off, etc. Maintainable lots require no impediments interior to lots (except signage/lighting) such as curb islands or landscaping. Adequate snow storage areas within the lot to minimize damage to surrounding landscaping promote annual surface maintenance and regular cleaning.
- vi. Create reasonable standards to limit the size of contiguous parking lots to soften the visual impact of large lots on campus streetscapes.
  - Elaboration: Maximum size should be viewed with regard to location, surroundings, topography, etc. 400 to 450 vehicles should be the target maximum. However, flexibility is encouraged in consideration for designs that incorporate enhanced setbacks, landscaping and other desirable, enhanced design features as trade-offs for special circumstances that require larger than normal lots.
- vii. Achieve a clarity of access from parking areas to public buildings.
  - Elaboration: Create a balance between pedestrian-oriented open space, buildings and landscape. The configuration, scale and location of future buildings can help overcome the image and reality of a once green campus which is fast disappearing under the automobile. Connect all portions of our expanding campus with a comprehensible pedestrian-oriented network of outdoor spaces which organize buildings and other activities. As we grow, an organized network becomes even more critical than it was early on.
- viii. Major construction projects must account for impacts to the parking system.
  - Elaboration: Some projects displace existing parking facilities. Other projects heavily impact the parking system even though they do not directly displace existing parking. The impacts to the parking system in both situations should be addressed through the project planning process for each building project, not deferred to become immediate problems for the parking system, and the costs should be borne by the project budget.



- To do otherwise would not only result in the parking budget subsidizing the construction of building space, but would also reduce the funds available to construct and maintain a well-designed, visually pleasing and efficient parking system.
- ix. Control bicycle circulation at center of academic core. Bicycle flow and storage shall be carefully planned. Provide adequate, hard-surfaced bicycle parking areas that are conveniently located.
  - Elaboration: The university will cooperate with the City in providing a network of bicycle paths to, from and on the campus. Adequate bicycle parking will be provided in convenient locations on campus, but not in a manner which would promote unnecessary intra-campus bicycle travel. In general, bicycles should share the roads and be treated as vehicles, and be discouraged from the pedestrian precinct. Street reconstruction should include signage and striping for bike lanes. Success of the central campus walk/push zone can be enhanced by conveniently located, permanent bike parking areas at the perimeter of the zone. Bike parking areas should be standardized with regard to types of racks, concrete surfacing, etc. Bike rack areas cannot be kept free of snow in the winter and in some cases may actually provide snow storage area themselves. Bicycle storage shelters should be considered on the periphery of the pedestrian precinct, and undercover bicycle racks should be located near building entrances. Lockers for bicycle storage and safety should be considered in the vicinity of shower facilities at the Marga Hosaeus Fitness Center or Romney Gym for students and employees who wish to commute by bicycle.
- x. Accommodate safe, well-lighted access as well as convenient handicapped access.



Plan for bicycle circulation

Safe, well-lighted access to all campus

### 1.2.2 Landscape Planning and Design Goals

Generally follow the Campus Landscape Master Plan through the following:

1. Design and maintain individual positive open spaces in a manner appropriate to their intended uses
  - Elaboration: Campus open spaces must include organized activity spaces, spontaneous activity spaces, formalized spaces, major and minor circulation spaces; yet spaces which are primarily sensory, perceptual and of aesthetic value have always been of equal importance to a Montana campus. Spatial subsets should include such ancillary uses as smoking spaces, lunch spots and waiting spaces. Special outdoor spaces for ceremonial use or for concerts should be developed as appropriate.
2. All new buildings shall be designed with appropriate site development and landscaping.
  - Elaboration: All new building projects should incorporate total site development of the adjacent grounds which may include plaza space, seating and other street furniture, lighting, grading and drainage, retaining walls, irrigation systems, service delivery access, and parking as necessary. Landscape planting design with care given to spatial definition, balance, and long-term management of plant growth is required.



- The environmental stress and extended time frame required for replacements of existing trees to grow to maturity demands proceeding with caution. Whenever mature or dying landscaping must be sacrificed, trade-offs such as enhanced restoration or other landscape amenities should be employed.
- 3. Balance campus spaces and buildings with appropriate placement of trees and shrubs.
  - Elaboration: Campus landscaping should be respected as a major element which binds together and unifies many diverse campus facilities. The MSU Landscape Master Plan provides a framework for these unifying elements.
- 4. Delineate the campus boundaries with unifying street trees.
  - Elaboration: Streets, especially those which serve as pedestrian-ways and bikeways, should be planted to create a pedestrian-oriented campus setting rather than the appearance and experience of a poorly planned retail parking lot. Formally plant the perimeter of the campus with unifying street trees to identify the campus edge.
- 5. Be responsive to Bozeman's climate in the placement and selection of plants.
  - Elaboration: Hardiness and survival of plants shall be major criteria in plant selection. Montana's climate extremes greatly reduce species selection. Montana is in an area of frequent drought. Indigenous vegetation which is more easily acclimatized and requires a minimum of long-term watering and maintenance should be utilized for both environmental and budgetary reasons. Planting of shade trees and tall evergreens shall be determined by shade and shadow patterns as they relate to human comfort and safety.
- 6. Reinforce the teaching and research value of the plant collection.
  - Elaboration: Over-planting of individual species should be avoided. In order to maximize teaching values, plant groupings should follow logical association such as geography, environment, historic association, taxonomic relationships and micro-climatic opportunities. Donations through memorials to the Campus Nursery are encouraged for the benefit of the total campus landscape.
- 7. Evaluate the existing landscape prior to alteration or removal.
  - Make the adjacent improvements part of the construction package and included in the project budget and financing.
- 8. Incorporate street furniture at appropriate locations to enhance outdoor interaction.
  - Elaboration: Site furnishings such as lighting, benches, trash cans, and signs will generally conform to established campus standards to act as unifying elements in the campus fabric. Outdoor seating areas should be created which will enhance places for people to congregate.
- 9. Design elements so that they will discourage unintended uses.
  - Elaboration: Avoid creating attractive public nuisances. Design curbs, steps and handrails to discourage unsafe or unintended uses such as skateboarding by use of textures, patterns and/or materials which disrupt the regularity of the edges.



10. Incorporate sculpture and other appropriate focal points for visual interest.
  - Elaboration: Sculpture, interpretive signage, and other features should be prominently displayed to add enlightenment and discovery to the academic core. It should be carefully integrated into the campus setting and appropriately blended with the campus landscape.
11. Maximize technological advancements with minimal detrimental visual impact.
  - Elaboration: Functional elements such as utility boxes, satellite dishes, cellular antennas, and cameras should be carefully sited to minimize visual intrusion and should be appropriately screened with plantings.
12. Establish unifying visual elements for ceremony and celebration.
  - Elaboration: Banners attached to campus light poles can be used to announce special events, ceremonies and to further the impact of campus identity. They can also add to the visual unity of the campus core.

### 1.2.3 Safety and Informational Goals

1. Provide well lighted public spaces and corridors. Apply campus lighting standards uniformly to all primary access corridors.
  - Elaboration: Eliminate dark areas along the corridors between perimeter parking lots and the main campus without over-lighting landscaping or spilling undesirable light to surrounding areas. MSU is committed to “dark skies” design standards for all exterior building, landscape, sidewalk and street lighting.
2. Provide emergency notification devices and emergency vehicle access at critical locations.
  - Elaboration: Provide campus standard outdoor “blue light” emergency communication pylons in critical areas for convenience and safety. All exterior building and landscape areas should be jointly evaluated with MSU campus police and the campus fire marshal to confirm adequate access for security and emergency vehicles
3. Security of buildings and specific spaces within must be planned and coordinated at the time of programmatic review.
  - Elaboration: Offices, laboratories and other “private” or secure facilities should be separated from public areas of the building. Zones of the building requiring security should be securable without compromising the viability of public spaces or the continuity of public circulation routes.
4. Provide clear standardization of information using minimal number of signs.
  - Elaboration: Direct visitors to visitor information and visitor parking locations from the edge of campus using signage that is distinct from traffic/enforcement signage, yet easy to see, pleasant and unobtrusive. Consideration and design of all appropriate site and building signage should be a part of the project scope. Refer to MSU Wayfinding standards. Minimize signage while clearly communicating necessary



information and develop a hierarchy of visual continuity. Provide places for public notice to convey a dynamic collegial atmosphere. All exterior campus signage shall be reviewed and approved by UFPB prior to fabrication and installation.

#### **1.2.4 Public Art Goals**

Provide artistic and aesthetic focal points at appropriate locations in the landscape and in the buildings. Sculpture, interpretive signage, and other features should be prominently displayed to add enlightenment and discovery to the academic core. They should be carefully integrated into the campus setting and appropriately blended with the campus landscape. Further, they should act as unifying elements that integrate into the campus fabric. All proposed public art must be presented to the Public Art Committee for review and approval.

- A. Public art should meet one of these three criteria for existence:
  - i. Artistic expression
  - ii. Conveyance of historical message
  - iii. Site development/enhancement
- B. Public art should meet the following design criteria:
  - i. Must be made of weather-resistant and durable materials, if located outside
  - ii. Color palette should consider and be sensitive to the existing campus palette
  - iii. Must be independently stable and permanently anchored

#### **1.3 General Administrative Procedures for Design Consultants**

This manual is intended to provide Design Consultants with the guidelines and procedures required to provide professional services for new construction and remodeling projects on the MSU campus. The design, construction and materials standards and recommendations contained in this manual are the product of many years of collective wisdom and experience from the staff in the MSU offices of Campus Planning, Design & Construction (CPDC) and Facilities Services. It is understood that not all of the instructions contained within this manual will be applicable to each project, and that on occasion, deviations from these standards may be requested to meet special conditions. The designated CPDC Project Manager will facilitate obtaining necessary approvals of any variations required by special conditions.

The intent of the MSU Campus Design Guidelines is to assist the Design Consultant in achieving the best end goal desired by MSU in regard to design, selection of materials, effective layout of spaces and preferred installations of products and systems.

All information listed below regarding project responsibilities and procedures is for general information and is not intended to supersede the requirements set forth in the Design Consultant's contract for services with the university. In the case of any conflict between this language and the language of the contract, the contract shall govern.



### 1.3.1 Procedural Instructions

#### 1. General

- A. The Design Consultant will manage the entire project effort in a timely manner. A proposed project schedule shall be submitted by the Design Consultant to the Project Manager at the outset of the project. The Project Manager will manage the project process and assist in the execution of the project by responding with information and communications with the Client Representative and other university entities as necessary.
- B. The Design Consultant shall refer to other sections of this document for the MSU planning and design philosophies or projects impacting the exterior areas of Campus. This document can be accessed on the PDC web site at <http://www.montana.edu/us/pdc/>.
- C. All projects at MSU will be designed in accordance with all local, state and national codes that may pertain to the scope of the project and which are in effect at the time of permitting of the project.
- D. The University Facilities Planning Board (UFPB) must review projects that impact either exterior or interior public spaces. If UFPB approval is required, the Project Manager will present the project to the committee at one or more of their scheduled meetings. The Design Consultant may be asked to attend or present and is to coordinate this with the Project Manager at the appropriate time(s) during the design.
- E. The Project Manager, will provide to the Design Consultant information the university has regarding the building or area impacted by the design in printed and/or electronic format. This may include original construction documents, previous completed projects and floor plans. Information is provided for the Design Consultant's general information but is not represented to be complete or accurate. It is the responsibility of the Design Consultant to review and confirm all information provided.
- F. All projects at MSU deal directly with, or are impacted by, existing facilities and infrastructure including underground infrastructure. MSU will provide to the Design Consultant information the university has regarding existing utilities and infrastructure, however it is the responsibility of the Design Consultant to confirm all information in the field. The Design Consultant will be thorough in their investigation of and response to existing conditions.
- G. The Design Consultant has a specific obligation to investigate and bring to resolution all code, safety and accessibility related requirements of the project.
- H. The Design Consultant will investigate and specify products, materials and processes that will ensure adequate quality for the intended use. Substitutions prior to the bid opening will only be allowed with CPDC's approval and in accordance with the bid documents. Substitutions after the bid period will only be allowed in accordance with the construction documents.

Submit a project schedule at the start of the project

MSU will provide current floor plans and access to original building plans

MSU will provide information on underground utilities



Reviews of contract documents occur at 35 percent, 65 percent and 95 percent of completion

Requirements for hazardous materials investigation and abatement

2. Correspondence
  - A. During the programming, design and construction phases of the project, the Design Consultant shall generally correspond with the CPDC Project Manager. The Project Manager will act as the primary point of contact for the Design Consultant to others that are involved in the project, including the Client Representative. Lines of communication between the key project entities are to be established by the Building Committee at the project kickoff meeting.
  - B. All correspondence should reference the complete MSU project name and PPA number (include the State A&E project number if applicable).
3. Design and Drawing Reviews
  - A. At the milestones indicated in the Design Consultant's contract, design information, plans and specifications shall be submitted to the CPDC Project Manager for review. These milestones occur at the end of Schematic Design (commonly referred to as the "35 percent submittal"), end of Design Development ("65 percent") and the Construction Documents ("95 percent") phase. Larger projects may require two reviews during the Construction Document phase. The development of the Drawings and Specifications are to correspond to the "Consultant Performance and Document Requirements for that particular phase.
  - B. The CPDC Project Manager will coordinate the review of these documents with other key project entities, including the Client Representative, CPDC and Facilities Services. The Design Consultant and their sub-consultants may be required to attend and participate in these reviews and should allow for a two-week review period for each submittal.
4. Existing Conditions
  - A. At the start of a project, and no later than the beginning of Schematic Design, the Design Consultant is expected to independently examine and document the existing conditions, including utilities and building systems, for all areas in and around the project location. CPDC's Records Clerk and CADD Technician can provide original record documents of existing campus facilities and as-built documents from previous projects in electronic (PDF) format for the Design Consultant. In addition, above/below ground utility and other site information is available for most of the campus. All information being provided to the Design Consultant is understood to be for background information only, and MSU does not attest to the completeness or accuracy of the information.
  - B. The Project Manager will provide the Design Consultant with information that MSU may have regarding the presence of hazardous materials in the building or area in which the project is planned. This information is not represented to be exhaustive in nature and the Design Consultant should request any additional examinations they deem necessary in order to identify hazardous materials that maybe present and/or need to be abated as part of the project. The hazardous materials abatement plan should be incorporated into the Design Consultant's construction documents and included as part of the scope of work.

- C. Information between the campus Client, the Design Consultant, the Contractor, and any other campus or off-campus entities as may be required for the execution of the project.
- 5. Project Meetings
  - A. The Design Consultant shall manage all required and necessary project meetings and site visits. This will include preparation and distribution of the meeting agenda 24 hours prior to the meeting, preparation and distribution of meeting minutes. Each meeting should include agenda items for discussion of the project schedule, budget and progress. The Design Consultant will prepare and distribute meeting minutes and site report notes for all meetings.
  - B. The Project Manager will provide agenda formats to the Design Consultant for Pre-Bid and Pre-Construction meetings.
- 6. Project Budget
  - A. The Design Consultant is responsible for preparation of the project budget at each phase of the project, unless otherwise instructed.
  - B. All statements of probable construction costs (estimates) will include project costs for construction, design contingencies, alternates, professional fees, and permits. The Project Manager will provide an MSU form for the estimate, which will include markup factors, FS, ITC and other required fees.
  - C. The Project Manager will review the preliminary and final estimates, examine them for conformance with the project budget, and review them with the Client Representative.
  - D. If at any point in the design process, or after bidding of the Work, the estimate or the construction bids exceed the stated project budget it will, under the terms of the Contract, be the responsibility of the Design Consultant to modify the design to bring the work into conformance with the budget.
- 7. Construction Administration
  - A. The Design Consultant is responsible to furnish drawings and specifications sufficient to obtain competitive bids and the appropriate building permits. The Design Consultant will apply for the building permit with the appropriate jurisdiction(s). On typical projects, MSU will pay the plan review fee and the Contractor will pay for the building permit.
  - B. The Design Consultant will review all shop drawings and other submittals on a timely basis for conformance to the contract document requirements. A copy shall be submitted to the Project Manager for review after the Design Consultant's review.
  - C. The Design Consultant and all consultants will notify the Project Manager of each on-site visit.
  - D. Site visit reports shall contain observations and shall be in a format approved by MSU. Field instructions, change orders, change directives, clarifications and punch lists shall contain directive terminology stating the problem and corrective action. Copies of all correspondence between the Design Consultant and Contractor shall be forwarded to the Project Manager.

Design Consultant  
responsible for project  
cost estimates



### 1.3.2 General Instructions for Contract Documents

1. Drawings
  - A. Design professionals using AutoCAD to produce construction drawings will follow MSU's CAD Standard. At the beginning of each project, the Design Consultant shall review MSU's most recent CAD Standard. Any requests for variation from the Standard must be approved by the Project Manager or the CADD Technician in writing. Drawings submitted during Schematic Design will be reviewed by CPDC for conformance to the Standard. The Design Consultant shall make corrections to the drawings as required to meet MSU's Standard.
  - B. All drawings will be produced on MSU's standard size sheets incorporating standard border and title block information. Refer to the CPDC's CAD Standard document, available at <http://www.montana.edu/us/pdc/arch/caddstandards.php>
  - C. Each sheet of the final original drawings shall bear the seal and signature of the appropriate licensed Design Consultant according to Montana State law and the Authorities Having Jurisdiction.
  - D. The Design Consultant shall provide record documents incorporating changes made during the construction process which reflect the as-built conditions in accordance with the Owner Consultant Agreement. These drawings must adhere to MSU's CAD Standard and shall be transmitted to the MSU CADD Technician within 30 days after the date of Final Acceptance for review and approval.
2. Project Manual (Specifications)
  - A. The Project Manager will provide a standard "boilerplate" to the Design Consultant at the beginning of each project. This information should be reviewed thoroughly for coordination and content. The boilerplate typically includes the Invitation for Bids, Instructions to Bidders, Proposal, Performance Bond, Labor and Material Bond, Affidavit on Behalf of Contractor, Consent of Surety, General Conditions of the Contract, Supplementary General Conditions, Substitution Request Form and Montana Prevailing Wage Rates. The boilerplate will also include pertinent Division 0 sections.
  - B. All specifications shall follow the current Construction Standards Institute (CSI) format.
  - C. The project manual cover shall bear the seal and signature of the Design Consultant. It should include the approved project name, CPDC's PPA number, and the State's Architecture & Engineering project number (if applicable).
  - D. The specifications shall include a list of submittals required for the project, to be incorporated into the Division One information.
  - E. The Design Consultant shall follow the Montana Code Annotated (MCA) Procurement Procedures in the development of the specifications. Sole source items are not permitted unless approved, in writing, by MSU. Whenever possible, the specification shall list three approved manufacturers for any one item of material. The specification must state sufficiently the description, manufacturer's names and catalog numbers, technical data, etc. so the bidder will have a complete understanding of what is required to bid on.



- F. Products shall be noted as “no substitution”, “approved equal” or “prior approved equal”. Approval during the bidding period of items, materials or processes not listed in the Contract Documents will be done only by Addendum. “Prior Approved Equals” will require submittal of information with the form included in the specification. Limit the use of substitutions and require “prior approved equals” whenever possible.
- 3. Design/Material Standards
  - A. In addition to indicating all buried utilities on the drawings, the Design Consultant shall clearly communicate on the Contract Documents that the contractor shall notify the Project Manager 72 hours in advance of any type of excavation activity. The Project Manager shall be notified immediately of any damage occurring to utilities.
  - B. It shall be indicated in the contract documents that, except for materials and equipment to be salvaged for reuse or to remain the property of the owner, all demolished materials and equipment are to be removed from the project site by the contractor immediately and disposed of by legal means. No temporary storage or collection sites are available on the MSU campus. Use of university dumpsters is not allowed.
  - C. Designs shall be in compliance with the requirements of the latest published version of the Americans with Disabilities Act guidelines, ADAAG. This requirement extends to the exterior site portion of projects.
- 4. Assignment of Room Numbers
  - A. Room numbers must be approved by CPDC. Room numbers will be assigned, according to standard MSU room numbering guidelines, at the end of Schematic Design, and must be coordinated with existing rooms for all new buildings and renovation and addition projects. Assignment of correct room numbers early in the design is important, so that all drawings provided by the Design Consultant are consistent and accurate.

#### 1.4 Building Design Service Life Expectancy

In general, MSU buildings are to be designed with an overall, 75-year, life expectancy. The life expectancy for any facility shall equal the life expectancy for the following items: designed life of building, inaccessible or structural components, expensive or difficult to replace components (for example, below-grade utilities), major replaceable components, and exterior materials. There are two exceptions to the above. These include buildings with a 75-year life expectancy shall have a life expectancy for major, replaceable components of 25 years and some student housing buildings may be designed with a 30-year life expectancy.

University facilities  
designed for 75 year  
life expectancy

For buildings and sites over 50 years old, CPDC will initiate the consultation process with SHPO during the early phases of the project.

Principles for Sustainable Building  
See Appendix 1.6-1  
-Sustainability

## 1.5 Preservation of Architecturally Significant elements

MSU has a responsibility to protect the physical features and historic character of properties designated on the National Register of Historic Places and the State Register of Cultural Properties which includes those properties that are considered eligible for such designation. MSU maintains a list of these properties and will notify the design team at the initiation of any project impacting them.

Before the start of renewal and new construction projects which will affect designated or listed properties, MSU is required, in cooperation with the Montana State Historic Preservation Office (SHPO), to determine appropriate treatments and to seek ways to avoid and mitigate any adverse effects on designated or listed properties. The Design Consultant may be requested to provide supporting information to assist MSU in initiating the consultation process with SHPO.

CPDC, through the University Architect and Associate University Planner, provides analysis, interpretation and advisory input on all historic buildings, objects, landscapes, and archeological sites affected by renewal, new construction, restoration, rehabilitation, renovation, and maintenance projects throughout the Montana University System (MUS).

## 1.6 Sustainable Building Principles

MSU was founded in 1893 on principals of land stewardship. It began as a School of Agriculture and has evolved into a University of 7 Colleges and over 70 Departments, Centers, Institutes and Programs, extending over 900 acres of the beautiful Gallatin Valley of Montana. In addition to identifying and reinforcing important visual and physical connections to our agricultural context, development on campus should be an example to our students and community of how sustainable development can enhance the short term and long term quality of our environment.

MSU recognizes that along with effective long range planning, a greater transformation is necessary to advance its commitment to environmentally, socially and economically sustainable decisions and choices. See the MSU's Long Range Campus Development Plan (Design Guidelines: Appendix 2.1) for existing sustainable practices and recycling efforts that are in place and are to be considered for all projects.

These principles are intended to provide direction and point towards resources for sustainable designs and construction of new buildings and the comprehensive renewal of existing buildings at MSU. The requirements of this process are intended to complement other sections within the Campus Design Guidelines which contain requirements particular to specific building programs or systems. These Sustainable Building Principles are summarized as follows:

- Set goals and benchmarks for each project
- Conduct a site survey and evaluate existing conditions.
- Model various methods of meeting goals and benchmarks and use results to make decisions.
- Repeat the modeling and analysis as the design is developed to refine decisions.
- Review and monitor the expected outcome during documentation and construction.
- Measure the outcome to determine success, and to establish benchmarks for future projects.

### 1.6.1 Sustainable Building Process

The Project Manager will notify the Design Consultant whether or not this process will be carried out for the specific project under consideration.

#### 1. Integrated Design

- A. Buildings are often comprised of interconnected networks with complicated and complex systems. Building in a sustainable manner requires consideration of those networks and systems, as well as the individual components, and can be best accomplished through an integrated design process, i.e. the active and continuing participation of all members of the project team. The Building Committee and the Design Consultant (and the Construction Manager if using the General Contractor/Construction Manager alternative delivery method) must collaborate to find the beneficial relationships among site and building systems that result in an environmentally sustainable outcome in support of the program. The Design Team must be committed to working through a collaborative process to learn new ways of considering these systems.
- B. New construction and major renovation projects will benchmark against the equivalent to LEED silver rating. At the beginning of the project, the Building Committee will determine if formal LEED project certification will be sought.



Minimum Benchmark:  
LEED Silver exclusive  
of certification

2. Organizational Meetings

- The Design Consultant will plan and facilitate meetings with the Building Committee and other campus committees specifically to further the integrated design process during different stages of the project:
  - A. Programming/Pre-Schematic : the Design Consultant will facilitate a Sustainability Charette to establish goals and objectives with respect to sustainable building design, benchmarking and metrics. Ideally, this will be done as part of a broader agenda focused on overall project goals including program, campus planning and project-budgeting. If those goals have already been set, a meeting focusing specifically on sustainable design objectives which are mutually supportive of other project goals will be conducted.
  - B. Pre-Bid and Pre-Construction Meetings: During the Pre-Bid the Project Manager and the Design Consultant will convey project sustainability objectives to bidders. Requirements will be reviewed again at the Pre-Construction meetings for relevant trades.
  - C. Final Acceptance: At the conclusion of the project the Design Consultant will facilitate a Best Practices meeting in order to evaluate the process and the initial outcome.

3. Required Documentation

Following is a summary of documentation requirements for the sustainable design:

- A. As part of the programming document or feasibility study, record of the project's sustainability goals from the Sustainability Charrette, including benchmarking objectives and metrics.
- B. Record of largest energy impacts & priorities based on preliminary energy model in conjunction with the mechanical and electrical narrative.
- C. Projected energy usage.
- D. Energy model reports.
- E. Annotated LEED checklists.
- F. Meeting notes from the Best Practices meetings recording the discussion and recommending improvements for future projects and processes.

## 1.6.2 Social and Environmental Impact Assessment

Below is a list of considerations for social and environmental impact assessment. This list is not intended to be all-inclusive, but to highlight anticipated issues for review and discussion:

1. Land Use, Water and Ecosystem Quality
  - A. Retain open space
  - B. Optimize program and development density
    - i. Limit site disturbance
    - ii. Reducing building footprint
  - C. Increase flexibility / adaptive reuse potential
  - D. Optimize building orientation
    - i. Utilize passive design strategies
  - E. Reduce heat island effects
    - i. Providing adequate shade coverage
    - ii. Select high albedo / light-colored materials
    - iii. Select high-reflectance, high-emissivity roofing materials
  - F. Reduces automobile use
    - i. Promote efficient transportation alternatives
    - ii. Optimize parking lot location and design
  - G. Maximize water use efficiency
    - i. Reduce potable water use
    - ii. Use captured or recycled water
    - iii. Employ sustainable landscaping strategies
  - H. Minimize storm-water runoff
    - i. Select permeable paving materials
    - ii. Increase on-site stormwater filtration
    - iii. Reduce stormwater contaminants
  - I. Employ restorative design strategies



Promote  
transportation  
alternatives

Has the Design Team  
addressed the social  
and programmatic  
factors?

Permeable paving  
materials





Have the social and environmental items relating to materials and waste been addressed?

Daylight and natural ventilation



2. Social & Programmatic Factors
  - A. Improve building safety and security
  - B. Improve site security
  - C. Improve interior acoustic control
  - D. Reduce exterior noise pollution
  - E. Reduces exterior light pollution
  - F. Improve operational efficiency
  - G. Provide flexibility of systems
  - H. Promote user information and education value
3. Materials and Waste
  - A. Reduce solid waste generation
    - i. Enforce construction / demolition waste management plan
    - ii. Promote existing building reuse
    - iii. Select reused and salvaged materials
    - iv. Select recycled content materials
    - v. Reduce non-renewable resource selection
    - vi. Maximize storage / collection of recyclables
  - B. Select rapidly renewable resource materials
  - C. Select low-embodied energy materials
4. Indoor Environmental Quality
  - A. Optimize ventilation effectiveness
  - B. Employ natural ventilation strategies
  - C. Minimize indoor and chemical pollutants
    - i. Select low-emitting materials
    - ii. Encourage non-toxic maintenance protocol
    - iii. Design separation from exterior pollutants
  - D. Increase thermal comfort, improve controllability of systems
  - E. Optimize natural daylight and view

5. Energy and Atmosphere
  - A. Reduce fossil fuel depletion
  - B. Using renewable energy sources
  - C. Reduce energy-related emissions
    - i. Reduce greenhouse gas emissions
    - ii. Reduce ozone-depleting emissions
    - iii. Maximize envelope thermal performance
    - iv. Integrate daylight / electric lighting controls
    - v. Improve Mechanical systems performance
    - vi. Eliminate equipment use of CFC's (chlorofluorocarbon refrigerants)

### 1.6.3 Materials Selection

Conscientious design is the first step towards controlling the generation of solid waste on a building project. Effective design-stage waste reduction strategies include existing building reuse, optimization of building program, envelope and systems energy efficiency, the use of alternative building materials (salvaged, recycled content and rapidly renewable materials), detailing and dimensioning to limit material waste, proper planning for the storage and collection of recyclables, and sustainability-oriented design specification language and contractor requirements.

Durability, maintenance and aesthetics are the primary criteria for materials selection. These standards have been developed on a material's proven ability to meet the programmatic, maintenance and aesthetic performance goals of MSU through the test of time and use. See the [Appendix Section x.x.x](#) for these standards.

Changing technologies have resulted in a wealth of new materials on the market. The potential for their application in MSU building projects is encouraged provided adequate evaluation of the primary criteria cited above.

Have the material selection requirements been incorporated into the project specifications?



#### 1.6.4 Waste Management

##### Design Specifications and Construction Waste Management

1. According to the EPA (Environmental Protection Agency), construction, deconstruction and land-clearing debris combined comprises at least 24 percent of municipal solid waste. Establishing waste reduction goals and supplementing cost-effective construction waste management techniques can significantly reduce this impact and provide economic advantages for projects of all types and scales. Currently, the MSU's established goal is for the recycling of 95 percent of all eligible materials post-abatement.
2. The Design Consultant shall include in the project specifications the requirement for the contractor to submit a construction and demolition waste management plan for approval by the Design Consultant and Project Manager at the beginning of the submittal and renewal period (or earlier when applicable). This plan must include, but is not limited to the following:
  - A. Analysis of the proposed project site waste to be generated, including the types of recyclable and waste materials generated (by volume or weight).
  - B. A list of each material proposed to be salvaged, reused or recycled during the project.
  - C. A list of proposed recycling facilities to be used in the project.
  - D. An outline of proposed project waste management meetings (at a minimum, waste management goals and issues shall be discussed at the Pre-Bid meeting, Pre-Construction meeting and regular project construction meetings).
  - E. Materials handling procedures for removal, separation, storage, and transportation.
  - F. A communication plan for informing subcontractors and crews about the waste management plan, establishing job-site instruction, notification and signage procedures for waste management and providing a methodology for documenting and reporting quantities of types of materials reused, salvaged, recycled, and disposed.
  - G. Proof of distribution times, weights, etc from trucks removing debris from the project site.
3. Other effective specification waste-reduction strategies include the use of bid alternates for undertaking specific recycling measures, the use of language that requires waste reduction, reuse and recycling to the fullest extent possible. Useful waste management references for both Design Consultants and Contractors can be found in Appendix 1.6-1(Sustainability Resources).
4. Project specifications and contracts must include the Contractor to provide proof of delivery to recycling sites in accordance with the MSU's internal deconstruction and construction debris recycling goals. Early in the process, deconstruction contractors should provide the Project Manager with a list of proposed recycling facilities intended for use as part of the project recycling plan.

### 1.6.5 Commissioning

Commissioning is an integral part of the sustainability effort for all projects which include new or modified mechanical systems. On smaller projects the Design Consultant may provide commissioning services, but on all larger projects MSU will engage a commissioning agent under separate contract.

### 1.6.6 Site Planning

1. The Long Range Campus Development Plan speaks to both campus-wide and neighborhood-specific strategies for
  - A. utility distribution
  - B. stormwater management
  - C. energy efficiency goals / targets
  - D. sustainable landscape strategies
  - E. planting materials
  - F. paving materials
  - G. exterior lighting plan
  - H. transportation and parking plan
  - I. potable water use plan.
  
2. The greatest potential for understanding and managing the environmental impacts of a project is through early and multi-disciplinary consideration of
  - A. site selection criteria
  - B. building siting
  - C. orientation and massing
  - D. water usage
  - E. stormwater management
  - F. landscaping strategies.

The Sustainability Charrette (to be conducted during the Pre-Schematic/Programming phase) is intended to ensure that these critical issues are addressed by the Design Consultant in a timely and holistic manner (Refer to Section 1.6.3 Outline of Process).



Outline of  
Site Planning Process:  
See Section 1.6.3

Project Responsibility  
Checklist Form  
See Appendix 1.7-1

## 1.7 Project Responsibility Checklist

The project responsibility checklist is intended to assist the Project Managers in developing consistent approaches to respective phases of every project. Although not every task herein is listed or necessary, the overall method of project delivery commonly follows this format and serves as MSU's standard. Dates are to be inserted by the Project Manager as each task is completed by MSU or the Design Consultant. Shaded areas indicate the responsible party. Please note that many tasks have a dual responsibility between MSU and the Design Consultant (See Appendix 1.7-1).

### List of Acronyms Used

- BIM – Building Information Management
- EHS – Environmental Health and Safety
- GIS – Geographic Information Systems
- LCCA – Life Cycle Cost Analysis
- PM – Project Manager
- SRM – Safety & Risk Management
- UFPB – University Facilities Planning Board

## 1.8 Documentation and Archiving

The purpose of this section is to state the requirements for documentation and procedure for archiving project documents.

1. The documentation requirements involve specific formatting and procedural requirements for drawing production, particularly related to Computer Aided Drafting (CAD). The archiving requirements pertain to both CAD and printed materials.
2. All requirements are intended to be consistent with the General Conditions of the Contract for Contractors and Owner Consultant Agreement for the Design Consultant. The aforementioned documents provide a basis by which the university may accept or reject the digital deliverables related to a project. These requirements are to be adhered to for all projects.
3. Guidelines have been established for the process of calculating both the net and gross square foot area of MSU buildings. The Design Consultant should anticipate the incorporation of these guidelines as they apply to the building program (See Appendix 1.8-4).
4. During the Schematic Design Phase, the Design Consultant must meet with the CPDC to review the process for the square foot calculation of areas and classification of operational uses for the various elements of the building program (See Appendix 1.8-4).



### 1.8.1 Room Numbering Requirements

1. It is the intent of all projects to have permanent room numbers assigned by the end of the Schematic Design Phase. It is the responsibility of the Design Consultant to initiate and complete this process by submitting floor plans with room numbers, and the Project Manager's responsibility to gather required approvals. All drawings shall reference MSU's approved final room numbering system.
2. Guidelines have been established for the process to be followed in the assigning of numbers and designations for both net assignable and nonassignable spaces. The Design Consultant should anticipate the incorporation of these standards into the construction documents for the project and should work with the Project Manager to conform to the system set forth in Appendix 1.8-3.
3. To facilitate the understanding of room numbering requirements, a meeting with the Project Manager and Design Consultant should occur at the start of the Schematic Design phase. This meeting will clarify the appropriate method for assigning room numbers based on previous MSU projects. **1.8.2 Existing Documentation Availability and Distribution**
4. Electronic documents of site and building information are available and accessible in a variety of formats. The Project Manager will assist the Design Consultant to obtain the information and options for transferring of data.

### 1.8.2 Archiving Requirements

1. The preparation and submittal of well-executed closeout documents requires close coordination between the Design Consultant and Contractor as defined by the General Conditions of the Contract for Construction and the Owner Consultant Agreement.
2. The list of required documentation may be found in the Project Closeout Checklist in Appendix \_\_\_\_\_. It is the responsibility of the Design Consultant and the Contractor to ensure that all documentation is submitted in order and in a timely manner. This procedure is initiated by the Design Consultant, providing latest design information to the Contractor in the field. Once received by Contractor, the following procedures apply:
3. As-Built – consists of Contractor or Sub-Contractor produced documentation of work in place of respective systems.
  - A. Submission requirements may be found in individual Specifications sections of the Contract Documents
  - B. At a minimum, all systems listed in Specifications shall be submitted by the Contractor. The Contractor is required to provide dimensional verification of all plans, in addition to any changes made to the documents or work during construction.
  - C. Refer to the Summary of Document Archiving Requirements in this section for details.

4. Project Record Documents – Consists of Design Consultant produced versions of the latest Construction Document set sent to the field with the addition of all information from the As-Built Drawings and Project Manual.
5. Operational and Maintenance Manuals/Data – The Contractor shall submit all operations and maintenance manuals to the Design Consultant for review and approval, prior to the final demonstration of the equipment.
6. After final approval, the Design Consultant shall deliver one complete set of digital files and sets of printed copies to the Project Manager. See Appendix \_\_\_ for more details.

#### **1.8.3 Archiving Requirements – Paper**

The Design Consultant will provide two paper copies of record drawings on 20 pound bond paper and three copies of the Project Manual to the university. A/E will provide three copies of O&M information to the university.

#### **1.8.4 Archiving Requirements – Electronic**

The Design Consultant will provide an electronic copy of Record Drawings, Project Manual and O&M manuals in the format noted in the Owner Consultant Agreement and as noted in Appendix 1.8-2.

#### **1.8.5 Closeout Documentation Review**

Prior to submission to the university of all Closeout documentation listed, complete the MSU project Closeout checklist.

#### **1.8.6 Formatting of Printed Deliverables – As-built Drawings**

Document Identification

1. Project Title
2. Drawing Title
3. Project Location
4. Document Submission Date
5. Name and Dress of Subcontractor
6. Contract Name and Telephone Number
7. Revision Dates
8. Scale and North Arrow include the specific reference (NAD83, Grid or Magnetic) to any applicable information such as deed, filed plan.
9. Datum and Grid / Ground Scale Factor Notes

### 1.8.8 Formatting of Electronic Deliverables

#### Document Identification

All requirements for document identification from printed deliverables apply to electronic deliverables. Additional digital requirements are specified in Appendix 1.8-2. Formatting of Electronic Deliverables

### 1.8.9 Use of Montana State University Existing Digital Data

MSU strives to be completely digital, including the conversion of all existing hard copy building and utility plans to digital CAD drawings. After the Design Consultant is under contract, MSU will provide relevant available electronic files for the project. The digital information is provided to assist the Design Consultant obtain as much information about the existing conditions related to the project and shall be used for any other purpose by the Design Consultant. While the information is as accurate as possible, discrepancies between drawings and actual existing built conditions may exist. To that extent, MSU does not warrant the accuracy of the information provided.

### 1.8.10 Building Information Modeling

1. The use of Building Information Modeling (BIM) will be utilized where appropriate and if required by the Owner Consultant Agreement. The use of BIM will
  - A. enable measurable improvements to the quality of projects and savings in cost and time.
  - B. It will promote value-added visualization,
  - C. simulation and optimization technologies (such as renderings, cost estimating, energy modeling, and clash detection).
  - D. The BIM model will also be used after completion to complement, leverage and improve facilities management technologies.
2. The project-specific BIM requirements will be established at the project inception, based on collaboration with the project team, led by MSU. All parties of the Project Team will work collaboratively together to establish a BIM Execution Plan early in the design phase that will provide a framework allowing the Design Consultant, the Contractor, and MSU to deploy BIM technology and best practices on the the project faster and more cost-effectively.
3. In addition to the design phase, the BIM implementation plan will include strategies for use of the BIM model during the bidding, construction and close out phases.
4. A digital copy of the BIM file shall be transferred to the CADD Technician for the Close-out documentation.
5. The Design Consultant submitting the BIM file for archiving by MSU shall include an Electronic File Transfer Disclaimer stating that the BIM file was produced for use on the specific project at that time and future use of the BIM file by MSU will not hold the original creator of the file liable for program discrepancies.

BIM Execution Plan  
- developed by the  
Project Team

Provide a Digital Copy  
of BIM Model: with  
Disclaimer

## 1.9 Accessibility

Much of MSU's historic campus was originally designed in ways which may not have provided for accessible routes and features to all parts of its buildings. Nevertheless, one of the goals of every MSU project is to enhance and improve the accessibility of the campus and its buildings, and to create accessible routes to and through MSU facilities accomplished without assistance or special knowledge.

Moreover, it is the goal of MSU that all new construction and renovation be designed and includes features to allow for independent use to the highest extent possible of all campus facilities by all individuals regardless of disability. MSU is committed to ensuring access for individuals with disabilities, including but not limited to students, employees, occupants, spectators, participants, consumers, or visitors.

1. MSU is subject to regulations under state and federal laws, including the International Building Code (IBC) and the Americans with Disabilities Act (ADA), and the Montana Human Rights Act. Under applicable law, disabilities may include physical, mental, sensory or cognitive impairments or disorders.
2. The Design Consultant is responsible for meeting all applicable codes as referenced by the Montana Department of Labor and Industry's Building Codes Bureau and regulations required by the ADA, specifically the ADA Accessibility Guidelines (ADAAG) adopted by the Department of Justice.
3. For all projects, in addition to meeting the above referenced codes and standards, any project-specific goals identified by MSU to enhance and improve the accessibility of the campus and its buildings must be considered and incorporated by the Design Consultant.
4. No modification may be undertaken that makes the campus less accessible. It is the MSU's long term goal to have an accessible campus to the fullest extent possible.
5. To begin identifying the extent of facility accessibility needs, MSU has compiled an ADA Transition Plan (insert link here) describing the location and the specific deficiency for each building.
6. For all projects, the Design Consultant shall review the Transition Plan and incorporate accessibility upgrades into the project scope if within the project site or boundary.



Accessibility  
Requirements  
See ICC/ANSI A117.7

See Section 2.9  
Pedestrian Access

### 1.9.1 University Review Guidelines

1. The Project Manager will facilitate a meeting, prior to the schematic design phase, with
  - A. the Office of Disability,
  - B. Re-Entry and Veteran Services
  - C. Parking Services (if accessible routes are part of the project) to discuss the project's goals with respect to accessibility.
2. For all projects, the Project Manager will review the project's accessibility goals with the Design Consultant and will serve to determine the scope of the accessibility improvements to be included in the final scope of work for the project. Refer to Design and Drawing Reviews in Section 1.3.2.
3. For any project that affects the exterior of the building, including walks, drives or landscape, a planning review by UFPB may be required.
4. The Design Consultant should consult the Project Manager at the beginning of the project regarding this process as it can be time consuming and projects are often time-sensitive.

### 1.9.2 Design and Procedural Guidelines

First and foremost, no alterations may be made to buildings or areas on campus that make the campus less accessible.

1. The Design Consultant must incorporate requirements stipulated by the IBC and the ADA regarding accessibility. Refer to Chapter 1.2.2 Building Location and Design Goals and Chapter 2.9 Pedestrian Access for additional information.
2. In addition to the building code requirements and accessibility guidelines, the Design Consultant shall use the following list to review with the Project Manager and incorporate into the final design these concepts that are applicable:



See Section 7.0  
Historical Buildings  
for Renovation or  
Additions to Historical  
Buildings





Assistive Listening  
System for  
Instructional Space  
See Appendix 1.9-2

Accessibility Program  
Document  
See Appendix 1.9-4

Accessibility Checklist  
See Appendix 1.9-5

- A. Connection of the new or existing building with the existing campus accessible routes and/or transportation features. These include but are not limited to the Streamline Bus and the Campus Accessibility Map (See Appendix 1.9-1).
  - B. If applicable, modification of existing entrances to provide accessible ingress
  - C. Access to primary function spaces in the building
  - D. Access to accessible toilets in the building Access to all public services in the building
  - E. Assistive listening system at all fixed seating classrooms
  - F. Identification of existing non-compliant conditions within the limits of the project scope
  - G. If applicable, workplace accommodations as appropriate for the building type
  - H. If applicable, accommodations for housing
3. The Design Consultant should be cognizant of normal construction tolerances, and as such, exercise appropriate judgment in applying code minimum or maximum dimensions so that installed work will always fall within federal and state guidelines.

### 1.9.3 Guidelines and Requirements for Documentation

1. The Design Consultant shall provide documentation in adequate detail for accessible features such that will allow review agencies to approve the project.
  - Proposed conditions shall be shown to comply with the requirements of the IBC and its barrier free subcode, and with ICC/ANSI A-117.1 American National Standard for Accessibility and the Federal standards as identified by the ADA and ADAAG.
2. The Design Consultant shall review and fill out the Accessibility Program Document for any new construction project with significant access considerations (See Appendix 1.9-4).
3. The Design Consultant shall review and fill out the Accessibility Checklist for any project in existing MSU facilities having accessibility-related issues (see Appendix 1.9-5).
4. Site plans need to show the accessible parking spaces required for the project if applicable, and accessible routes from existing parking lots, walks, or drives to accessible entrances.
5. The contractor shall provide an as-built survey to confirm the elevations along the accessible route.

## 1.9.4 Other Considerations for Accessible Design

The Design Consultant should review the following with the Project Manager, to ascertain approaches to accessibility and design features that might be unique to MSU facilities which above and beyond the requirements of the Code Requirements, but never less accessible than that required by the Code Requirements:

1. Site Related Design Issues:
  - A. Parking
  - B. Curb ramps, curb cuts and accessible routes
  - C. Walking / travel
  - D. Exterior and interior ramps
  - E. Exterior signage
  
2. Building Related Design Issues:
  - A. Building entrances
  - B. Floor surfaces
  - C. Doorways
  - D. Toilet and bathing rooms
  - E. Elevators
  - F. Operational building components
  - G. Protruding objects
  - H. Clear floor areas
  - I. Interior signage Braille requirements
  - J. Handrails
  - K. Residence halls / dwelling units
  - L. Laboratory equipment and features
  - M. Classroom accommodations and features
  - N. Business and office spaces



ADA Design Guide  
See Appendix 1.9-3



## 1.10 Environmental Graphics

Environmental graphics includes both interior and exterior signs or lettering that are project specific, as well as campus-wide sign systems for wayfinding and information.

1. The Design Consultant is encouraged to retain the services of a Graphic Designer for all project-specific signage and to coordinate their work with emerging campus-wide sign systems (See Wayfinding below).
2. The MSU LRCDP and LMP have set forth campus signage goals that are to be incorporated into every project (See Environmental Graphics Checklist Appendix 1.10-3).

### 1.10.1 Exterior Building Signage

1. Typically each building project requires at least two types of exterior signs,
  - A. a building identification sign (building ID) showing the officially recognized name of the building (See Appendix 1.10-6), and information signs for ADA routes, service deliveries, parking, etc. The building identification sign should be located near the primary entrance and its design is to meet the current design standard.
  - B. The determination of primary vs. secondary entrances is to be made by the Project Manager during the design phase.
2. MSU's Wayfinding and Signage Plan shows several examples of appropriate use of materials and typography for exterior building identification; these include carving directly into the building's stone, pin-mounted metal lettering, vinyl lettering on glass, and various metal plaques.
3. There are many existing precedents on campus; informational, regulatory and traffic signage and are included in the Wayfinding Plan (See Appendix 1.10-1).

Building Information signage (See Appendix 1.10-6).



MSU Campus  
Wayfinding Plan  
See Appendix 1.10-1

Environmental  
Graphics Checklist  
See Appendix 1.10-3

### 1.10.2 Interior Building Signage

In addition to complying with building code requirements and ADA guidelines for interior signage, the Design Consultant shall follow the Interior Signage Standard (Appendix 1.10-2) for the following locations for size, color, typeface, and Braille requirements:

1. Auxiliary entrances
2. Individual rooms (offices, classrooms, etc.)
3. Stairs
4. Hallway / corridor
5. Restrooms
6. Mechanical / custodial rooms
7. Elevator
8. Area of refuge
9. Room occupancy
10. LEED plaques

Technical information for construction specifications regarding solutions for manufacturing of signs (i.e. CNC, pressure molded, sand blasted, etc.) is included in the Door and Room Signage Specifications (See Appendix 1.10-5).

### 1.10.3 Dedicatory Inscriptions

In addition to the design of interior building signage, graphic design services may also include design of a dedicatory, commemorative, or memorial inscription or plaque, as part of the project. Whenever relevant, the requirements will be provided to the Design Consultant during the schematic design phase by the Project Manager.

### 1.10.4 Print Guidelines

The MSU graphic identity program consists of logo and tagline information as well as branded fonts, color palettes and photography style. These visual identity guidelines apply to use of the MSU name, logo, and brand strengths in print, electronic, and video communications. The Design Consultant may access this for general information through MSU's University Communications website.

Building Information  
Signage  
See Appendix 1.10-6

MSU Graphics &  
Communications  
Office Website:  
[www.montana.edu/  
cpa/](http://www.montana.edu/cpa/)

MSU Wayfinding Plan  
See Appendix 1.10-1





### 1.10.5 Wayfinding

MSU is currently moving from a conservative use of exterior environmental graphics to the deployment of a comprehensive, yet, discreet, Campus Wayfinding Program.

1. The program consists of a campus-wide directional and informational sign system, campus maps and directories, which are geared primarily for campus visitors.
2. The improved College Street and South 11th Avenue entry signage set the standard requirements for campus entry points.
3. CPDC shall locate primary and secondary entries to campus.
4. MSU's LMP describes the goals of campus-wide wayfinding and should be referenced by the Design Consultant.
5. Wayfinding signage shall be designed by the university's Graphic Design Consultant and will be implemented over time.
6. Campus wayfinding is generally independent of project specific signage but may in some instances be used to supplement exterior building identification (See the Montana State University Wayfinding and Signage Plan Appendix 1.10-1).

### 1.10.6 Construction Signage

The Design Consultant shall review the Construction Signage Standard (Appendix 1.10-7) for design examples and guidelines and include in the contract documents. The Design Consultant and the Contractor shall review the location of the construction sign with the Project Manager for final approval prior to installation.

### 1.10.7 Review Guidelines

1. Documentation for interior signage typically comes late in a construction project, and review is generally limited to the Project Manager, the University Architect, and representatives of the client department.
2. If the Project Manager determines that a consultant independent of the design firm will be used for signage, then the signage is usually shown on plans specifically drawn for that purpose; otherwise the signage will be included on the construction documents as shown in the Appendix 1.10-8.
3. Typically, signage proposals will be reviewed in preliminary form, and may proceed directly to the final plans, depending on the complexity of the project.
  - A. Design Consultants shall provide timely and coordinated responses to all review comments. Preferably, with the assistance of the Project Manager, review meetings should be held with respective internal contacts as identified by the Project Manager to facilitate this process.



Signage  
Documentation  
Checklist  
See Appendix 1.10-8

Construction Signage  
Standard  
See Appendix 1.10-7





- B. The Design Consultant is responsible for documenting minutes of all these meetings. There, review comments or recent revisions may be discussed and documented.
- C. If these review meetings are not held, or if any non-compliant design or component is selected, the Design Consultant shall provide MSU written documentation of respective changes prior to submission of the next round of documents.

**1.10.8 Procedural Guidelines – Preliminary Design and Design Development**

- 1. The Design Consultant should determine at the beginning of the project, in consultation with the Project Manager, whether a Graphics Consultant will be used on the project and what the scope and budget of graphic services will be for the project.
- 2. During preliminary design, the Design Consultant is to consult with the Project Manager to ascertain
  - A. the level of signage needed for a building,
  - B. that required for specific building areas, and
  - C. that needed in the area around a building.
- 3. The Design Consultant is to develop a code-conformance schedule, outlining the minimum signage to meet code requirements.
- 4. The building exterior signage shall comply with the MSU Wayfinding and Signage Plan (Appendix 1.10-1).
- 5. The building interior signage shall comply with the Interior Building Signage Standard and Interior Building Information Signage (See Appendix 1.10-3).
- 6. Floor plans, indicating the location of each sign, and a sign schedule, with sign types listed on a room-by-room basis, are to be included in the Design Development review set.
- 7. The Design Consultant shall provide an elevation drawing of sign type, showing mounting heights, and specifications, for the Construction Document review set (See Appendix 1.10.2).

**1.10.9 Guidelines for Installation and Performance**

- 1. Signage for room numbers is considered permanent and shall comply with ADA barrier-free requirements.
- 2. Names that may be attached to or be a part of a room number sign should be easily adaptable and changeable. Window signs, for example, allow the client/user to maintain the signs in the building. To this end, a limited graphics computer program is will be provided to the client, which will allow the creation of new sign inserts in the Design Consultant’s selected typeface and format.

Graphics Consultant may be required by CPDC Project Manager

Wayfinding Plan  
See Appendix 1.10-1

Building Information Signage  
See Appendix 1.10-6

Door and Room Numbering Standards  
See Appendix 1.10-5

Signage Meeting Occurs before Design Development

3. Interior signage is typically installed using double-faced foam tape.
4. Installation of signage is either done by the Contractor or by a work order to Facility Services, depending on the size and complexity of the installation.
5. Once the final scope, size and construction schedule of the building is determined in Schematic Design, the Project Manager will determine if the Contractor or Facilities Services will install the signs.
6. For exterior signage, concealed, and/or vandal-proof, fasteners are preferred. Through-bolts are not to be used unless no other option is available, and then only with permission from the Project Manager. Embedded anchors are typically used on masonry.

For residence hall interior signage, see Section 6.3.

### 1.11 Furniture, Fixtures and Equipment

During the development of the Initial Project Information (IPI), the need for, and the extent of, interior design services for the project is to be determined. The Design Consultant should come to an agreement with the Project Manager to determine responsibilities for space planning, and the design, specification, procurement and installment of furniture, fixtures, and equipment; whether design is to be done under the project Design Consultant's, whether a separate design professional will be engaged or whether the MSU will assume responsibility for the design and purchasing of furnishings under another arrangement. The scope and budget for furnishings must be established early on to ensure delivery and installation will fall into its proper sequence in the project schedule. An inventory of the existing furniture and equipment may be required if concluded that they will be re-used or re-purposed in new or renovated space.

#### 1.11.1 Design Guidelines

The shapes and sizes of office, classroom, and lab spaces vary greatly, although there are furnishing needs common to many uses. Depending on the department and use of space, there may be a greater or lesser need for pieces such as shelving or filing cabinets, work tables or computer stations, etc. Some of the common elements follow.

Finishes are dependent on a number of factors – budget, aesthetics, etc., and may be different for different functions and positions within a department. The furnishing of public spaces should reflect the nature of the building's architecture, while other spaces may vary from such design constraint and take on a more personalized character.



Who Has FF&E  
Responsibility for the  
Project?

Existing Furniture and  
Equipment Inventory

## 1. Work Spaces / Office Spaces

The Design Consultant should consider the following to determine the extent of furniture for office areas:

- A. Chairs - office task chair, ergonomically-designed, and guest chairs,
- B. Work surfaces - sufficient depth, sufficient space for multiple monitors, keyboard, and a phone. Provide adjustable-height surface only if requested by MSU.
- C. Computer accessories - space for towers, keyboard trays, printers, etc
- D. Task lighting - assess lighting levels at work surface, coordinate with layout and overall lighting design
- E. Storage - freestanding bookshelves, binder bins, lateral file cabinets, and pedestal or mobile file cabinets. The amount of storage will vary with the needs of the office space type (closed office, open office, for faculty or staff). Determine the amount of storage required for each space type. For any storage selection that is attached to walls, provide sufficient blocking within walls to support the weight. The height and configuration shall not interfere with the sprinkler systems. Provide manufacturer's standard lock on all storage units.
- F. Seating area or meeting table - determine the number of seats required
- G. Tack boards and markerboards (chalkboards not permitted)
- H. Coat hook - 1 per office, wall-mounted
- I. Cable management - location and number of grommets, managed pathway for all cables, proximity to power and data

## 2. Laboratory Furnishings

- See Section 6.1 - Laboratory Design.

## 3. Classroom Furnishings

- See Section 6.2 - Classroom Design.

## 4. Residence Hall Furnishings

- See Section 6.3 - Residence Hall Design.

## 5. Furnishings for Meeting Spaces

- A. Review access to power and data connections (including the need for table-top connectivity) and audio-visual equipment, including whiteboards, smartboards, and glassboards. Coordinate table placement and design with all aspects of technology.
- B. Determine number and type of seating to be used – stacking/non-stacking, ganged, task seating, etc.
- C. Consider flexibility of the space in the design and selection of the tables and chairs within the meeting space movable, modular, one-piece, etc.



Door Hardware  
Standards  
See Section 4.1

Laboratory Design  
See Section 6.1

Classroom Design  
See Section 6.2

Residence Hall Design  
See Section 6.3

Conference Room and  
Seminar Room Design  
See Section 6.11

6. Furnishings for Lounge Spaces and Lobbies

- A. In planning a lobby or building entry space, the Design Consultant shall locations for building directories, signage, appropriate furniture, trash and recycling receptacles. See Section 1.10 - Environmental Graphics and Section 2.7 - Trash and Recycling Areas.
- B. Because lounge spaces and lobbies are often an extension of the architecture of a building, the Design Consultant should place special emphasis on the selection and coordination of the furniture and fixtures with the architectural character and function of the space to create a welcoming and inviting entrance.

**1.11.2 Requirements for As-Built Drawings and Project Closeout**

- 1. At the end of the project, the Contractor or Vendor is to supply in electronic format,
- 2. As-Built furniture installation plans indicating
  - A. all wall mounted components,
  - B. systems furniture and freestanding case goods,
  - C. locations or work surface supports, and
  - D. integral lighting and power and data accommodation.
- 3. Product identification and dimensions are to be included on the plans, as well as
  - A. walls, window and door openings, and
  - B. elements requiring access such as HVAC units, power and data receptacles.
  - C. Also required are lamp specifications for relamping task and ambient fixtures.
- 4. Information is to be formatted so that it can be tied to locations, and make it possible to derive the contents on a room-by-room basis.
- 5. One hard copy with actual finish samples and vendor contacts is to be provided for project library.

**1.12 Security**

MSU maintains a campus that is open to students, faculty and staff and to any visitor to campus, and encourages interaction between members of the university and the community. Given those facts, providing for the security and safety of students, faculty, staff, and the general public must be addressed in the design of our facilities and exterior spaces.

**1.12.1 Procedural Guidelines – Programming and Schematic Design**

During schematic design, the extent of security needed for the building’s exterior, or the building’s entrance, or any rooms within the building, is to be defined by MSU. The Project Manager shall facilitate a meeting with the University Police, the University Fire Marshall, the Building Committee, and any others on campus to determine this. These issues may include, but are not limited to, the following:



Environmental  
Graphics  
See Section 1.6

Access Control  
Systems  
See Section 3.1



1. Discussion and coordination of user requirements
2. Card Access Control System (CACS) design. CACS required at one exterior access, mechanical at all other locations
3. Fire Safety Security Monitoring System (FSMS) building
4. Fire alarm status system in lobby Card access system training requirements
5. Campus video management system

### 1.12.2 Design Guidelines – Passive Security Features

The Design Consultant should be aware of features that can be included to enhance safety in and around the building, and should also be aware of problematic conditions that might make a project inherently less safe. Some of the features to consider follow below:

1. Landscaping: Use landscaping to enhance a design, but avoid creating heavy cover, dark areas and isolated areas.
2. Path Routing: Design paths with sufficient lighting, and avoid cul-de-sacs and dead-ends
3. Building Configuration: Take care in the building layout to avoid alcoves, blind corners, enclosed courtyards

The Design Consultant, the Project Manager and the Contractor are to review the construction staging plan and/or the limits of construction, prior to start of construction, to ensure the highest level of security for the construction site and for the safety of the people that may be near the site.

### 1.12.3 Design Guidelines – Active Security Features

The Design Consultant should pursue solutions that will enhance the safety of the project, both during construction and subsequent occupancy. Many of the features that provide safety to building occupants and to the public can be simple solutions working through the process of thoughtful design, and the employment of common sense answers.

If determined that active security features are required for the project, the Project Manager shall facilitate a meeting during Design Development, with the University Police (UPD) and Safety & Risk Management (SRM), to review the proposed system and the location of devices. The following systems are possible solutions and have been used previously on campus:

1. Exterior
  - A. Security cameras (Central Video Monitoring System), may be placed at selected areas of campus, where required.



Passive Security  
Consider visibility  
from exterior and  
within interior spaces  
of the building





2. Interior
  - A. Card access, using identification cards
  - B. Code access, using PIN keypads
  - C. Combination locks in specific areas (Trilogy electronic locks, non-alarmed, for special-use areas such as computer rooms and laboratories)
  - D. Security cameras, may be placed at selected areas of campus, where required.

END OF SECTION 1.0

## 2.0 SITE

### 2.1 Site Planning

MSU was established in 1893, officially called the Agricultural College of the State of Montana, and in 1917 the Cass Gilbert Plan was created. This plan was implemented throughout the early years of MSU and molded what is now the historic core of the campus. In 1982, the Montana State University: Master Plan for Campus Development was created at the same time the City of Bozeman updated its master plan. The current Long Range Campus Development Plan (LRCDP) continues with the development goals and implementation processes that were created in the 1982 plan with additional and more relevant goals for future development on campus.

MSU published the LRCDP (Appendix 2.1-1) and a Landscape Master Plan (LMP) (Appendix 2.2-1) in support of projected, significant academic expansion while preserving the historic beauty and walkability of the campus. These plans break down the scale of the campus through the identification of “campus neighborhoods”: to assess local site relationships within the vibrant diversity of the campus as a whole. The Design Consultant shall become familiar with the LRCDP and LMP and embrace its guiding principles within each respective project design.

#### 2.1.1 Design Guidelines for Site Planning

The image and identity of MSU is closely tied to the natural landscape, attracting students, faculty and staff from around the world. In this context, it is appropriate to think of buildings as backdrops to the exterior spaces that are ultimately the cohesive factor in experiencing MSU’s campus.

Buildings may give form to the exterior space, they may frame an exterior space, or they may create circulation patterns for exterior space. Overall, the following concepts, which are explained in greater detail in the LRCDP and LMP, are to be adhered to in the site planning aspects of project design:



MSU Long Range  
Campus  
Development Plan  
See Appendix 2.1-1

Landscape Master  
Plan



1. Hierarchy of Spaces: The building placement and plantings should reinforce and enhance the hierarchy of exterior spaces (for example: campus, building, entrance, etc.)
2. Sequence: There is to be a sense of continuity between spaces; where major spaces are enhanced by the sequence of moving through secondary spaces; where there is a play of expansion and contraction, of light and shade.
3. Connection: Connections between existing buildings, structures, walks and plazas, and open space are to be created and reinforced to further tie the campus together, through views, vistas and experiential travel to and from the site.
4. Context: There is to be an understanding of the immediate, established context adjacent to the project site and an awareness of the overall context of the campus. The design of the building, and the design of spaces and landscape around the building, shall result in a project that compliments and reinforces this context. Circulation through, and around, the project must also relate to its context by connecting to existing circulation, or to create new routes, to make a seamless transition between new and existing.
5. Elements: All new buildings and major renovations should include designated areas for bike parking, snow removal, trash and recycling facilities, and outdoor seating. The detail of these elements is discussed later in this section.

### 2.1.2 Internal Review Guidelines – Site

If a project affects an exterior site or the exterior of a building, the Design Consultant shall meet with the Project Manager to determine whether the extent of the change requires a review by UFPB or a review by Facilities Services to understand the impact of the project to site utilities and landscape. The purpose of the initial meeting with the Project Manager is to understand the project's scope and design concept for all site work, including site utilities. The PM will schedule a meeting to obtain the required campus approvals and to maintain the project's schedule. All final site plans must be reviewed by UFPB before implementation.



University Facilities  
Planning Board  
Website  
[www.montana.edu/  
us/committees/ufbp](http://www.montana.edu/us/committees/ufbp)



The Project Manager has the responsibility of insuring that the scope and concept for all sitework has been approved by UFPB and additional MSU departments.

As part of the milestone submittals (See Section 1.3 - Design and Drawing Reviews), the following deliverables for site design, if applicable are required:

1. Existing conditions survey: prior to the start of Schematic Design (see Section, 2.1.9 General Survey Requirements).
2. Sidewalks, drives, service areas, parking, plazas, site walls, accessible routes: Schematic Design
3. Landscape design concept & planting areas: Schematic Design
4. Planting materials: Design Development

### 2.1.3 Internal Review Guidelines – Landscaping

The review for landscaping projects is similar to projects that involve site design and may require UFPB approval. Smaller grounds maintenance or replacement projects may not need review by UFPB, but will still be required to meet the Design Guidelines and are to be reviewed by CPDC and Facilities Services. The Project Manager will schedule a meeting to obtain the required campus approvals and to maintain the project's schedule. All final landscape plans must be reviewed by UFPB before implementation.

The university may also employ a Landscape Design consultant to help plan and document MSU's landscaping projects. This consultant should be considered a member of the Design Consultant, and should be consulted on all issues regarding landscaping and site planning.

CPDC will review the proposed location and layout of buildings, walks, drives, plantings, etc. to ensure continuity with the MSU's Long Range Campus Development Plan and Landscape Master Plan and for other university goals, such as improving accessibility.

1. It is the Design Consultant's responsibility to provide accessible routes within the project site and to connect these to accessible paths outside of the project site.
2. The Project Manager may utilize an internal or outside consultant to review and comment on the design to ensure compliance with current state and federal ADA requirements.



Sitework design and CD's submitted for

The Project Manager is responsible for insuring that sitework has been approved

3. As with any building project, when preliminary design is completed additional departments may be brought into the Design Development and construction planning phases. Special consultants may also pay a part in the final design and review of all projects.
4. Landscaping projects are exempt from City of Bozeman jurisdiction review.
5. CPDC will notify the City of Bozeman of any projects that are adjacent to City of Bozeman property. A review is not required, but it is MSU's procedure to keep the City of Bozeman informed.
6. As part of the milestone submittals (See Section 1.3 - Design and Drawing Reviews), the following deliverables for landscaping, if applicable, are required:
  - A. Landscape design concept & planting areas: Schematic Design
  - B. Selection of planting materials: Design Development
  - C. Drawings and Specifications for all landscape materials, including soil preparation, lawns, planting materials: Construction Documents

#### 2.1.4 Internal Review Guidelines – Utilities

Before Schematic Design, the Project Manager will facilitate a meeting for the Design Consultant with the CPDC CADD Technician and Mapping Technician to discuss existing site utilities. These individuals maintain the campus utility plans and can also be a source of general knowledge for involving agents for public utilities in the project. These plans are available to the Design Consultant in electronic format upon request.

1. Prior to the design of utilities, a site survey shall be completed to document horizontal and vertical locations of all utilities within the boundary of project site, and beyond, to provide sufficient information to properly design the utilities for the project (See Appendix 2.1-2 for additional information).
2. CPDC can provide assistance in locating utilities for each project. Likewise, MSU, with proper support from the Design Consultant, will often make application to local utilities for the needed services. The approach taken varies from project to project, and will need to be confirmed prior to construction. Unless otherwise determined, site utilities required for the project are to be included in the project.



Landscape projects are exempt from City of Bozeman review

Site Survey  
Requirements  
See Appendix 2.1-2

3. Utilities that can be made available to the site by MSU include:
  - A. Steam and condensate
  - B. Chilled water (localized areas)
  - C. Electric power
  - D. Emergency electric power (within specific specific building locations only)
  - E. Stormwater drainage
  - F. Voice and data communications
4. Utilities that are provided by public or private agencies include:
  - A. Sanitary sewer
  - B. Domestic water
  - C. Fire protection water
  - D. Natural gas (utilities must be provided separately for each building; utility company regulations prohibit feeding one building through another. The route for utilities must be outside any building's footprint. The utilities will not allow a building to be built over an existing service route, but would require that the service be re-routed) .
5. Sleeving for all utilities is required under paved areas. The Design Consultant is to coordinate with CPDC and Facilities Services for required locations and sizing of sleeving.

See Section 5.5 (Utility Guidelines) for additional information. See this Section; Item 2.2.3, for layout of trees over utilities.
6. Stormwater runoff is a concern to local, county, and regional authorities, and is closely reviewed in the planning, permitting, and construction phases of a project. The amount of hardscape in a project directly affects the stormwater detention requirements, and must receive appropriate attention in the design phase.
7. All stormwater systems on campus are regulated under the MS4 Co-Permittee. The MS4 committee is required to familiarize themselves with the MDT's MS4 permit requirements.

### **2.1.5 Guidelines and Requirements for Documentation**

As noted above, MSU maintains campus utility maps that can be used as the starting point for site survey information. Auto CAD planimetric data covering the campus can be obtained through CPDC to supplement the campus utility maps.



## 2.1.6 Sustainability

One of the goals of the LRCDP, is to “develop the campus using practices that avoid irreversible damage to natural resources by encouraging development projects that include utilization of green technologies and renewable materials.” These guidelines are intended to provide direction and resources for the sustainable design of exterior space, sites and utilities, new building construction, and the comprehensive renewal of existing buildings for capital projects at MSU. The steps of this process are described in Section 1.6 Sustainable Building Principles.

MSU performed a campus wide energy audit in 2011 to determine sustainability strategies for reducing energy costs pertaining to:

1. Energy efficiency goals/targets
2. Interior and exterior light plan
3. Energy efficient fenestration
4. Potable water use plan

The greatest potential for understanding and managing the environmental impacts of a project is through early and multi-disciplinary consideration of site selection criteria, building siting, orientation and massing, water usage, storm water management, and landscaping strategies. The sustainability charrette (to be conducted during the Pre-Schematic phases) process is intended to ensure that these critical issues are addressed by the design team in a timely and holistic manner.

## 2.1.7 Considerations for Exterior Design – Circulation

Open space priorities are a major concern of the UFPB and should be the starting point in site plan development. The Design Consultant should strive to enhance the experience of the open spaces while guiding people through those spaces. Careful consideration must be given to laying out walks and drives, the way such paths intersect, and to the materials of the paths.

The Design Consultant should address building service issues as an integral part of the site design in order to produce a comprehensive plan that will augment, or improve, existing services. Planning should include delivery routes, loading and unloading areas, service vehicle parking and trash and recycling storage areas.



Sustainable Building  
Principles  
See Section 1.6  
Sustainability  
Charrette

Has the project  
site plan taken into  
account the circulation  
requirements for the  
campus?  
-Vehicular  
-Pedestrian  
-Bicycle

Building use patterns and circulations should help to dictate the layout of future paths and pedestrian walkways. Allow for open and non-restrictive circulation to main entrances to buildings.

For all walks and drives, the Design Consultant should review any areas that need special treatment, such as snow-melting equipment or weather protection. The Design Consultant needs to keep in mind that all walks and paths at MSU are cleared of snow using mechanical means (as far as possible) so access for the equipment and storage of plowed snow is equally important as the placement and finish of the path (See Section 2.6 Snow Removal / Storage).

A landscape buffer is required next to all paved circulation pathways. No rock or mulch edging adjacent to paved areas is permitted for snow removal purposes.

On campus, circulation paths fall into several different categories, depending on use:

1. Vehicular Circulation
  - A. Vehicular circulation consists of three different categories: primary, secondary and tertiary. Each category allows varying levels of integration with pedestrian circulation (See Section 2.10 Vehicular Access below for further definition of requirements).
  - B. Along with circulation needs, the Design Consultant should be aware of various parking needs for MSU staff, visitors, and accessibility (see Section 2.4 Parking).
2. Pedestrian Circulation
  - A. The LRCDP has set goals to ensure the campus core remains pedestrian-oriented, limiting vehicular intrusion, providing safe access choices, encouraging alternate modes of transportation and providing service corridors and service access to all buildings.
  - B. Pedestrian circulation is divided into a three tiered design system: primary, secondary and tertiary. Each category allows for varying types of surface treatments (see Section 2.9 Pedestrian Access).
3. Bicycle Circulation (see Section 2.11 Bicycle Access):
  - A. Bicycles are an essential part of the overall circulation planning process. As MSU moves forward with reducing vehicular dependency on campus, the demand for bicycle transportation increases. In general, pedestrian paths and corridors are shared with bicycles. A comprehensive network of off-street pathways, on-street marked bicycle lanes, shared paths with pedestrians, and bicycle storage areas, are conducive to encouraging bicycle travel.
  - B. MSU will be coordinating with the City of Bozeman's bicycles trail system to ensure city-wide connectivity. The LRCDP designates bicycle trail connection points and should be referenced by the Design Consultant.



Snow Removal  
Storage  
-Indicate on Site Plan  
See Section 2.6

Vehicular Access  
See Section 2.10  
See Section 2.4

Pedestrian Access  
See Section 2.9

### 2.1.8 General Survey Requirements

For projects that affect existing grades, underground utilities, property lines, and other significant site work, the Design Consultant shall provide a survey by a licensed surveyor (see Appendix 2.1-2, Site Survey Requirements). All survey drawings are required to meet CAD Standards and electronic submittals requirements (See Section 1.8 Documentation and Archiving).

Upon request, MSU shall provide the Design Consultant with the most up to date available site and utility drawings relevant to the project. MSU will provide any CAD drawings in either the current version of Auto CAD or the version being currently utilized by the university. It is the responsibility of the Design Consultant to perform any necessary conversions to utilize the data.

### 2.1.9 Requirements for Record Documents

See Appendix 1.8-2 Record Document Requirements and the Owner Consultant agreement.

The Project Manager is responsible for distributing the record drawings to the CADD Technician and to the Records Clerk at project closeout.



Bicycle Access  
See Section 2.11

Site Survey  
Requirements  
See Appendix 2.1-2

Documentation and  
Archiving  
See Section 1.8

## 2.2 Landscape and Planting

This portion of the Design Guidelines is to provide more specific details for landscape design and planting than the LMP and serves to address more project specific goals than planning and design “philosophies.”

### 2.2.1 Review Guidelines – Landscaping

Landscape projects or modifications must follow the Internal Review process set forth in section 2.1.4.

### 2.2.2 Considerations for Exterior Design – Planting Concepts

The following concepts should guide the Design Consultant in both building and landscaping projects on campus at MSU. While following the concepts listed below, the Design Consultant must coordinate with the layout of proposed utilities throughout the project and make adjustments to the plantings as necessary.

1. There is a hierarchy of open spaces which the planting (and any building) should reinforce and enhance.
  - A. The size of outdoor spaces should determine the scale of the planting, i.e. large spaces should contain large trees, while small spaces should have shrubs, small ornamental trees and perennial plantings.
  - B. Smaller, more defined spaces should be characterized by distinctive planting (color, scale and texture).
  - C. Large spaces should be defined by “structural” tree planting (e.g. perimeter planting and entrance definition).
  - D. Vistas should be reinforced by tree plantings where possible.
  - E. Plantings at buildings should emphasize and enhance the character of the architecture. Plantings within the landscape should define spaces.
  - F. No trees should be planted within 20 feet of buildings.
  - G. General foundation planting should be avoided.
  - H. All building perimeter landscape should include a two foot rock buffer strip with one of the following edging conditions:
    - i. Commercial grade plastic edging
    - ii. Commercial grade aluminum edging
    - iii. Concrete curb style edging (extruded or formed)
  - I. Wildlife habitat corridors should be planted with native vegetation and should be enhanced where applicable. Likewise, areas adjacent to agriculture operations or buildings should be planted with simple planting designs, featuring more trees and wind breaks than intricate or detailed planting beds.
2. Spatial sequences through the campus should be defined and enhanced.
  - A. Major entrances should be identified by planting.
  - B. The campus perimeter should be strengthened with planting.
  - C. Major campus axes should be defined by planting.



Planting to reinforce hierarchy of open spaces

Define and enhance spatial sequences





- D. Landscape design should reflect the setting of the building within the District and Neighborhood so that it complements the building use and provides the right type of spaces for circulation, socializing, bicycle parking, transition into the building, etc.
- 3. Plantings and landscape elements should provide solutions for various functional needs.
  - A. Security should be an upmost concern when designing plantings and site amenities. Open site lines should be maintained and landscaped areas should be properly lighted to industry and MSU standards for low, medium and high level lighting.
  - B. Provide shade for events and for outdoor use areas, including commencement, reunions, and other outdoor gathering places
  - C. Conceal unattractive use areas, including but not limited to, parking and loading areas, trash and recycling areas, and other service areas
  - D. Retaining walls should have separation from sidewalk in the form of a grass mow strip or a concrete curb to prevent deterioration of the wall. Planting design should reflect the micro-climate of the area:
    - A. Sunlight availability
    - B. traffic flow and impact
    - C. potential for “cow paths” to develop are to be considered.
- 4. Retain a 25 percent urban canopy: The MSU campus was once a treeless hilltop with grass and sage brush. However as the campus developed, so did the collection of trees and other plant vegetation, commonly called the “urban forest”. MSU has established the goal of retaining a 25 percent urban canopy (percent of campus covered by tree canopy divided by the total square feet of non-pervious surfaces, including hardscapes, roads and building roofs) and maintains a map to track the percentage of canopy. The Design Consultant is to provide the total area of non-pervious surfaces in the Schematic Design phase. reference the landscaping map on file at CPDC to ensure this percentage is being maintained.
- 5. The layout of trees over underground utilities must be avoided:
  - A. Review the tree location with possible conflicts with existing or new underground utilities. Establish the appropriate offset between tree and utilities and the Design Consultant is to ensure that offset is maintained until the tree planting is complete.
  - B. Utilities and trees should be planned and coordinated to maximize access for maintenance to the utility and to minimize the disturbance to existing landscape and plantings during construction.
  - C. Conditions caused by backfilling of utilities should be examined before final location of trees is determined.
  - D. Include maintenance periods for landscaping in the Construction Documents: One year maintenance period for lawns and plant material.

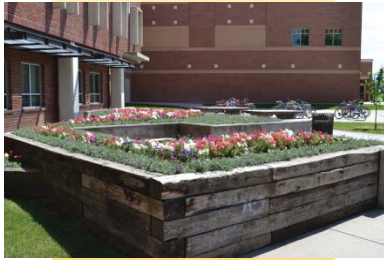


Maintain a 25 percent Urban Canopy

Avoid the use of invasive species







Plant Palette  
See Appendix 2.2-5

Landscaping  
Specification  
See Appendix 2.2-3

Lawns and Grasses  
Specification  
See Appendix 2.2-3

Tree Protection  
Specification  
See Appendix 2.2-4

6. Diversity of planting materials and spacing of plantings are important:
  - A. In choosing planting material for a project, the Design Consultant should recognize that diversity provides not only the opportunity for a pleasant variety of color and shade, but also insures that if disease strikes a particular variety, the entire bed is not lost.
  - B. Plants should be selected to:
    - i. avoid patterned planting that would be hard to replace dead plants,
    - ii. maximize diversity of species,
    - iii. group plants with similar watering needs to conserve water and provide for more efficient care during maintenance operations.
    - iv. preserve and improve the natural habitat
    - v. minimize unnatural inputs for survival (i.e. water, fertilizer, soil conditioners, etc)
    - vi. do not use invasive species
    - vii. not have fruit bearing properties close to paced surfaces or pedestrian plazas

### 2.2.3 Suggested Plant Palette

MSU has created a list of suggested plants to be used on campus (See Appendix 2.2-5). The plants suggested in the list have been selected for various reasons. In general, they share qualities that have proven that they are hardy for the zone; they are appropriate in regards to security, maintenance and long term viability; they are noninvasive; they create diversity; and they provide significant visual or aesthetic impact for the investment. Plants not listed in this plant palette shall be submitted for consideration to MSU to determine if they are an appropriate alternative.

### 2.2.4 Landscape and Planting Specifications

The Design Consultant shall incorporate MSU's standard specification sections for the following: Landscaping, Lawns and Grasses, and Tree Protection into the Construction Documents for applicable projects (see Appendix 2.2-2 Landscaping, Appendix 2.2-3 Lawns and Grasses, and Appendix 2.2-4 Tree Protection).

## 2.3 Irrigation

MSU has gone to great lengths to install, maintain and operate an efficient and sustainable automated underground irrigation utility. This philosophy and the associated practices shall be continued and improved upon in all future projects involving both in-house and contractor installations and repairs.

1. MSU shall continue to push towards an entirely automated irrigation utility. Areas that are currently watered by hand shall be automated as funds become available, in the end saving labor costs and increasing efficiency.
  - A. This utility shall incorporate “smart” controls, by continuing to utilize Maxi-Com Control that allows the system to be monitored and track water usage from one point.
  - B. The central control increases irrigation system efficiency through the use of daily scheduling based on the previous days evapo-transpiration which is calculated by MSU’s on-site weather station to irrigate the amount of water lost the previous day and eliminating unneeded watering that is inadvertently done due to “blanket” programming on stand-alone controllers.
2. MSU shall strive to utilize entirely non-potable sources of irrigation water for all of central campus and Family and Graduate Housing irrigation.
  - A. MSU currently irrigates approximately 95 percent of central campus using non-potable water. Applications and associated permitting are underway in an attempt to add Family and Graduate Housing property to the area irrigated without the use of treated city water.
  - B. The use of untreated, non-potable water dramatically increases MSU’s irrigation sustainability program.

### 2.3.1 Irrigation Design

Factors, such as areas for planting beds, lawns, type of soils, and establishment period, shall be carefully considered in design of the irrigation system by the Design Consultant.

1. The Design Consultant shall incorporate MSU’s standard specification section for irrigation into the Construction Documents (see Appendix 2.3-1 Irrigation).
2. Head placement shall minimize overspray onto hardscapes and no heads shall spray onto buildings or the buffer strip by the building foundation.
3. All irrigation systems shall provide head to head coverage, even water distribution, and the highest efficiency possible with the selected irrigation head.



Irrigation to use 95 percent non-potable water

Standard Irrigation Specification  
See Appendix 2.3-1





All new landscaping tied to MSU irrigation system

4. The irrigation system design shall be reviewed and approved by CPDC, Facilities Services and the Irrigation Manager.
5. The Project Manager will facilitate site visits with the Irrigation Manager during construction of the project.
6. Where feasibly possible, all new irrigation projects shall be connected to MSU's non-potable, irrigation reservoir water source and to MSU's automatic irrigation system.
7. Micro-climates and landscapes features shall be taken into consideration for zone layout.
8. A point of connection will be identified by MSU. Available volume of water will be determined by MSU and shall not be exceeded in installation.
9. Any upsizing of adjacent / upstream mains required for flow will be the responsibility of the project.

### **2.3.2 Irrigation System Integration**

1. Central control product choices and installation placement must be reviewed and approved by MSU's Irrigation Manager to ensure complete compatibility and functionality with the existing control system.
2. All systems must be controlled by Maxi-Com Central Control and will include a fully functional radio communication system.
3. All control components must be installed by certified Maxi-Com Installer.

Install all irrigation piping with tracer wire

### 2.3.3 Installation

1. Using wire locate flags, the Contractor shall layout the irrigation components to be reviewed and approved by MSU's Irrigation Manager before any installation begins.
2. The Contractor is responsible for obtaining all utility locates and must have locates clearly marked on ground prior to any excavation, post pounding, etc.
3. Temporary systems for establishing during construction are prohibited.
4. All irrigation installations should be installed with a trace wire in order to enable the location of the underground piping during utility markouts.
5. Maxi-Com flow metering devices shall be installed at all points of connection according to Maxi-Com – Installation Parameters.
6. Water outage, Turn on, and irrigation runtime scheduling must be coordinated with MSU.
7. See the "Site Protection" section for requirements to minimize damage to
  - A. landscape
  - B. plantings
  - C. hardscapes
  - D. existing irrigation.
8. Any damaged irrigation components and landscapes will be repaired according to MSU specifications by an authorized commercial irrigation and/or landscape contractor and all repairs must be inspected and accepted by MSU.
9. Any mainline disruption and/or damage shall be repaired immediately.
10. The main shall be able to be put back into operation within three working days to avoid effects on areas further downstream.
11. As-Built drawings will be supplied within 30 days of project completion and reviewed with MSU Irrigation Manager for clarity before full payout can occur.
12. All electrical and communication wire repairs and splices shall be
  - A. repaired according to MSU specifications
  - B. shall be noted on As-Builts
  - C. be accessible through a ten-inch round valve box
  - D. splice lengths will be long enough to be accessible / inspected at ground level and be inspected by MSU Irrigation Manager prior to burying.
13. Additional, unused, "for future use" wires shall be installed according to MSU Specifications.

## 2.4 Parking

### 2.4.1 Parking Space Ratio

MSU currently has a high ratio of parking spaces per FTE among its peer institutions group.

1. The Design Consultant is to familiarize themselves with the goals set forth in the LRCDP to reduce this ratio over time by
  - A. increasing alternative modes of transportation
  - B. planning and constructing parking facilities to accommodate future university needs
  - C. continue to encourage bicycle use as a part of traffic and parking demand management.
2. Parking requirements for a project must be established during Programming and determined whether the parking will be included within the project site or in existing MSU parking lot.
3. Prior to final site plan approval, it must be demonstrated how the parking requirements for a project will be fulfilled.
4. The Design Consultant shall prepare a plan, working with the Project Manager, the Parking Services Manager, and other MSU departments, outlining parking requirements and provisions for use in the site plan review.

### 2.4.2 Existing Conditions

Parking availability within the campus core is limited, but usually has available parking along its perimeter, particularly to the south of campus. The parking is situated to provide convenient parking with a five-minute walk to destinations on campus. Demand for parking in the campus core is becoming increasingly difficult to accommodate as the campus expands and interior surface lots are converted to building sites.

1. When the design of a new building encroaches on, or is built on existing parking spaces, the project budget will be required to include a fee for each parking space removed to be allocated to a fund towards a future parking structure or lot.
2. The dollar amount per parking space is to be set by the Parking Services Manager.

For reference, see Campus Parking Map for location of all parking lots. (<http://www.montana.edu/parking/documents/ParkingMap2014.pdf> ).





### 2.4.3 Permits

Parking permits are required for all parking facilities on campus. The Design Consultant and Contractor are required to purchase a parking pass when doing work on campus, unless otherwise noted by agreements or contracts. There are eight different categories of parking on campus including remote, proximate, visitor, service, bicycle, and motorcycle. City streets adjacent to campus are categorized as either resident only, time of day or duration restricted.

Vehicle signage and parking signage is to follow guidelines set forth in Section 1.6 Environmental Graphics.

### 2.4.4 Construction Impact on Parking Lots

Construction staging areas generally negatively impact the areas / surfaces upon which they are placed, regardless of duration, and that the negative impacts have associated repair / restoration costs. Restoration costs associated with locating construction staging areas on landscaped surfaces are typically greater than the costs associated with staging on parking surfaces. When possible, construction staging areas are to be located on hard surfaces, such as parking areas, than on open spaces or landscaped areas. The Project Manager shall review options with the Design Consultant to determine possible locations and include proposed staging area on the Construction Drawings.

### 2.4.5 Future Parking and Parking Structures

As outlined in the LRCDP, parking structures and surface lots are best located at the perimeter of campus neighborhoods. Parking shall be located close to major streets, adjacent to primary campus gateways, and no more than a five minute walk to neighborhood destinations.

1. If public transit stops are added as part of a project, it is best to coordinate the location of the new transit stop with an existing parking facilities. The Project Manager will facilitate a meeting with the transit company to discuss proposed locations.

Construction Parking  
and Staging on  
Parking Lots  
See Appendix 2.4-2

2. Design parking structures that include architectural characteristics and include mixed-use or multi-modal opportunities.
3. Provide energy-efficient lighting throughout the parking system that also promotes dark-sky policies.
4. Design of parking facilities shall include appropriate measures for snow removal and storage. The Design Consultant is to coordinate parking lot layout with the Parking Services Manager.
5. If tree islands are to be incorporated into the parking design special are consideration is to be taken to ensure that:
  - A. Financing for the appropriate landscaping and irrigation system is included in the overall budget.
  - B. The tree island is designed in a way as to not create issues with snow removal.
  - C. Selection of trees and design of planting beds to be used shall be such that the roots do not damage the parking lot surface.

See Appendix 2.4-1 for parking lot curbs.

#### **2.4.6 Accessibility**

If the project includes parking, the design shall follow the ADAAG requirements and incorporate these requirements into the design of new parking facilities. Some existing parking facilities do not include accessible parking, however the required number of accessible spaces have been located in parking lots that serve clusters of buildings. The goal of location and number of accessible spaces at MSU is to provide opportunities to accommodate appropriate accessibility throughout the parking system.

The Project Manager will facilitate a meeting with the Parking Services Manager during Schematic Design to review the number and location of accessible spaces for the project relative to the spaces that exist on campus (see Section 1.9 Accessibility)



## 2.5 Site Signage

### 2.5.1 Environmental Graphics

MSU has set forth standards for signage to be used throughout the campus; See Section 1.10 Environmental Graphics.

### 2.5.2 Information Signage

Information signage includes ADA routes, service deliveries, parking, etc. the MSU's Wayfinding Plan (Appendix 1.10-1) includes standards for these signage types and is to be referenced by the Design Consultant.

## 2.6 Snow Removal and Storage

Snow removal is a seasonal issue on campus and must be addressed by the Design Consultant during site design. To optimize snow removal operations, drives and sidewalks must be designed to allow ease of movement for the snow removal vehicles and materials selected must be durable to withstand the methods used to remove snow.

1. There should be at least three feet of separation between lighting, site amenities and pavement for plowing ease in the winter.
2. Pathways and site features shall be appropriately sloped to allow proper snow removal and drainage into snow storage areas.
3. Design of building entrances and all paved areas adjacent to buildings are to be reviewed with the Environmental Services Manager. If appropriate, building entrances should be designed to include snow removal gratings near the entrance doors.

## 2.7 Trash and Recycling Areas

The design of trash and recycling areas shall be reviewed and approved by CPDC, Facilities Services, and the Environmental Services Manager. The Project Manager will facilitate a preliminary meeting for the Design Consultant to obtain information regarding current standards for trash and recycling containers, design parameters for access by collection vehicles, etc., prior the Schematic Design submittal (see Appendix 2.7-1 Trash and Recycling).

Environmental  
Graphics  
See Section 1.6

Wayfinding Plan  
1.10-1



### 2.7.1 Considerations for Exterior Design

All entrances to buildings are to include at least one trash receptacle and one recycling receptacle. Reference Appendix 2.7-1 for acceptable trash and recycling receptacles.

Where possible, trash and recycling dumpsters in service areas are to be sufficiently screened from view from major streets, heavily used sidewalks, and the Centennial Mall. Sizing of the trash and recycling containers shall be determined by the Environmental Services Manager to meet the building's required capacity. The screen shall not interfere with the function of the service area, snow removal, or create a safety issue. Reference Appendix 2.7-1 for acceptable screens and enclosures.

### 2.8 Exterior Lighting and Design

1. Lighting should be carefully considered in the design of the site and is an important element in security design. An effective security lighting design should consider all elements of the site, including
  - A. building location and usage
  - B. the landscape or planting plan
  - C. site walkways (including steps and ramps)
  - D. traffic patterns as well as the impact of the lighting on the surrounding areas.
  - E. Light pollution, trespass and glare should be minimized.
  - F. A consistent level of lighting will provide a sense that the site is well lighted and safe (an average of 1 to 2 foot-candles for exterior lighting is considered sufficient).
2. Many types of exterior lighting fixtures and poles have been used on campus. However, the use of direct burial, precast concrete poles and LED fixtures are becoming more common. Bollard lights are not permitted unless directed otherwise. Exterior lighting design shall be reviewed and approved by CPDC and Facilities Services. Review requirements for burial of power lines for lighting with Facilities Services Engineering and Utilities.
3. Point-by-point foot-candle calculations of the site lighting and voltage drop calculations for site lighting circuits shall be provided with the Contract Document submittal.
4. Photometric data shall be provided that shows the percentage of up light.
5. Footcandle calculations shall include the IES design level and classification used.
6. IBC requires that exitways be lighted (with emergency power backup) to the exterior of the building and at the exterior of the exitway; these lights should be accounted for in the design and calculations.

Standard Trash and Recycling Receptacles  
See Appendix 2.7-1



## 2.9 Pedestrian Circulation

Pedestrian circulation includes, but is not limited to sidewalks, paved plazas and footpaths. Most pedestrian circulation has been created as a result of historic traffic patterns and designed connections to building entrances. Unintended paths occur near building and sidewalk corners, where foot and bike traffic cross grass, causing significant soil compaction that inhibits continued vegetation growth. The LMP has set forth boundary and edge conditions to help alleviate the deterioration of landscaping.

MSU has worked with the City of Bozeman to align campus bike and pedestrian trails with the city designated trail system. Pedestrian crossings are to be coordinated with the City of Bozeman and MDOT to create safe pedestrian crossings to tie into the non-MSU roads and drives.

### 2.9.1 Pedestrian Pathways

1. Pedestrian circulation pathways are constructed of concrete. The primary east-west pedestrian corridor, Centennial Mall, is constructed of integrally colored concrete with a twelve inch border defined by an accent color. Primary circulation pathways eight feet wide or wider shall follow existing character and have a bordering pattern.
2. For walks seven feet wide or narrower, a single paving material without borders is recommended. In such cases, concrete pavers or concrete slabs are among the possible material choices.
3. Secondary walks lead from the main campus walks into buildings, may occur within courtyards, or simply cross open areas.
  - A. These paths are constructed of durable materials such as stone, concrete pavers or slabs, or brick.
  - B. All paving materials shall be laid over a base material suitable for the paver and anticipated traffic condition with a structural sub-base of concrete or asphalt to eliminate the potential for heaving.
  - C. With the exception of walks leading into buildings (which may be as wide as the building entry or form an entry plaza), these secondary walks are typically five to six feet wide.
  - D. If vehicular traffic is anticipated on a secondary walk, bands of unit pavers will be installed on either side of the walk, to increase the total width to eight to ten feet.



Photometric Diagrams  
are required for  
lighting

Determine Pathway  
designation:  
-Primary  
-Secondary  
-Tertiary







4. Tertiary walks lead to secondary entrances in buildings, or crisscross a green area. They are designed for foot traffic across open areas (or are sometimes installed after a traffic pattern has been established).
  - A. The material may be permanent in nature, such as concrete or asphalt, or may be renewable, such as compacted, decomposed stone, stabilized gravel systems or wood chips.
  - B. If concrete pavers are to be used, minimum dimensions are to be four by eight inches.
  - C. Minimum width for tertiary paths is four feet. Monolithic surfaces are preferred for sidewalks or other largely paved areas of circulation.
5. The first three feet from the sidewalk should be positively drained but not with greater than a two percent slope.
6. In order to accommodate some changes in elevations, steps may have to be incorporated into the design. Steps should be designed with a change in materials, or color change, to alert the pedestrian of the difference in grade.
7. An emerging challenge in site design has to do with the use of steps and plazas by roller-blade enthusiasts, skateboarders and stunt bicyclists. This activity has damaged a number of elegant site amenities, including stone-capped walls, memorial benches, and handrails. While a punitive policy of public space design should not result, the Design Consultant should be aware that what some would view as amenities become attractive nuisances for others. Landscape walls and railings adjoining pedestrian areas shall be designed to incorporate deterrents to abuse by skate and snow boards. Follow existing designs and materials where possible.

### 2.10 Vehicular Access

Although MSU tries to minimize vehicular traffic in the main campus area, there are undeniable requirements for access to each building such as trash and recycling pickups, mail delivery and pickup, delivery of supplies, furniture delivery, shop vehicles for normal maintenance of a building, etc. Certain academic disciplines may require frequent delivery of equipment or materials, and dining facilities, for example, have extremely heavy service requirements. There are periods of the year, including residence halls move-in and move-out days, reunions, and commencement, when unusually heavy traffic patterns occur, and universal access to campus areas is needed. Additionally, emergency access to a building must be provided for fire department and medical vehicles. The Design Consultant shall address types of service and service access in Programming and Schematic Design.

Service vehicular access to buildings is to be separated from parking areas. Services entrances are to be designed away from or screened from the main entrance to the building.



### 2.10.1 Vehicular Circulation Types

1. Primary: typical of streets characterized by full-width travel lanes for all vehicle types with curbs and raised sidewalks; usually paved with asphalt, with concrete sidewalks, curbs and crosswalks.
2. Secondary: pathways that serve both vehicular and pedestrian traffic. Currently, MSU does not delineate a separation of users, but will be moving towards characterizing these pathways by an asphalt center section, with additional width to either side in a different or contrasting paving material, set flush with the asphalt but defining the pedestrian space. Secondary vehicular pathways often serve as fire lanes or emergency routes, and must provide an 18-foot wide lane of stabilized base at a depth sufficient for fire truck criteria; refer to Appendix 2.1-4 (Campus Emergency Route map) for locations, and review requirements with Project Manager.
3. Tertiary: these are primarily pedestrian paths that can be used occasionally by service vehicles. Access is controlled by removable, lockable bollards spaced to allow for snow removal equipment to pass, but excluding normal vehicles. Verify bollard locations and spacing with CPDC during design phase. Minimum width for tertiary paths is six feet.

### 2.10.2 Emergency Vehicular Access

The Design Consultant should consult with the Project Manager and review the Campus Fire Lane Plan for requirements for a particular project. If a walk must be designed to carry emergency vehicles, there may be some increase in traffic-bearing capacity over normal university design, and the stabilized width most certainly will be increased. A common design variation is to provide the increased width using stabilized base and structural soil, which can then be planted with grass.



Campus Emergency  
Route Map  
See Appendix 2.1-4

## 2.11 Bicycle Parking

The design of all MSU facilities, or major site renovations, shall provide adequate bicycle storage near the entrances of buildings. CPDC shall review the design and location of bicycle parking and determine the appropriate number of bicycle parking spaces.

### 2.11.1 Bicycle Rack Design

1. See Appendix 2.1-5 for the design of the bicycle parking. Location of bicycle racks shall not impede snow removal around the building and may be movable for the purpose of snow removal.
2. Bicycle racks may be designed to be secured in place as deemed necessary per project and are to be located on a pad of pavers over stabilized base according to MSU's standard.
3. Sheltered bicycle storage areas shall be an integral design element to the project.
4. Bicycle racks are to be integrated into the design of all new transit stop shelters.



Bicycle Rack Standard  
See Appendix 2.1-5

**END OF SECTION 2.0**



## 3.0 Building Envelope

### 3.1 Access Control Systems

MSU requires that selected doors for academic and administrative buildings, and all exterior doors of residence halls, are included as part of the campus-wide access control system (CACS). During the Schematic Design phase of a project, a determination must be made, commensurate with the risks posed by the intended occupancy or use, regarding the extent of, or desirability of access control system, including interior door access control and/or intrusion alarm systems and/or ADA power assisted exterior doors.

If an access control system is required, all exterior doors, including mechanical rooms and mechanical penthouse doors which allow access to other parts of the building, must be incorporated into the CACS design. Inclusion of access control hardware may limit door design possibilities. Card readers are generally installed on the building exterior, with conduit and door / frame preparation integrated with the envelope design. While desirable for ease of system maintenance, card access readers installed in vestibules may pose security concern, depending on the design of the vestibule. Review proposed system with the Project Manager, Building Committee, and University Police.

The Design Consultant is responsible for the design and specification of the doors, door hardware and raceways to provide a coordinated installation of the access control system. The final configuration shall be reviewed by CPDC and Facilities Services (and Auxiliaries, if applicable) for approval.

#### 3.1.1 Guidelines and Requirements for Documentation

Sufficient documentation shall be prepared for design review of the access control system and for contract bidding of the work. Floor plans that clearly indicate locations of doors, door access control and operator diagrams, and specifications shall be prepared for all CACS construction documentation. Minimum documentation requirements include:

1. Door, Door Frame, and Door Hardware schedules
2. Door Hardware Product Data
3. Door Access Control and Operator Diagrams
4. Keying Plan

CPDC to facilitate meeting to determine extent and type of access control for project

Door Hardware Specification  
See Appendix 3.2-2

Door Documentation Checklist  
See Appendix 3.2-1

### 3.1.2 Guidelines for System Installation and Performance

1. New Construction and Renovation
  - A. All access control devices and junction boxes shall be accessible in accordance with the National Electric Code.
  - B. Raceways in finished areas shall be concealed where possible.
  - C. In the event that exposed raceway must be employed, the Design Consultant shall review the approach to the layout of the raceway with CPDC and shall specify the appropriate material.
  - D. All electromechanical door hardware shall be reviewed and approved by CPDC prior to installation. Installer must be a certified installer and qualified by the manufacturer. Doors shall be tested with electrical actuation of the hardware to provide proper adjustment. Testing equipment will be the responsibility of the certified installer.
2. Accessibility Considerations
  - A. Provide a standard size reader or larger accessible type
  - B. For locations required to be accessible, provide assisted door opener or fully automatic operation.
  - C. For doors greater than 2 inches thick, evaluate and select most appropriate opener for size of door and easily integrated with access control system.
  - D. Coordinate placement of card reader and/or accessible paddle with swing of door
3. Interface between Access Control and Fire Alarm Control Panel
  - Doors equipped with delayed egress features and/or magnetic hold-open devices shall have appropriate "supervised" wiring provided from the building fire alarm panel release function.
4. Requirements for Access Control Panel Locations
  - A. The building access control processor cabinets are preferably located in mechanical equipment rooms or electrical vaults that are in dry locations.
  - B. Data communication lines as well as emergency power and lighting requirements shall be provided to the location.





5. Signage

- A. Each door that is monitored and/or controlled by the card access system has a unique electronic address. This electronic address corresponds to a door number on the Construction Documents. Each door that is monitored and/or controlled by the card access system shall be labeled with the door number.
- B. The Construction Documents shall include a table of all door labeling requirements for the Access Control System. Exterior door numbers are determined no later than the end of Schematic Design Development phase.

6. Operational Performance

- Doors shall be reviewed for proper operation as a single entity, to ensure compatibility of all installed components. Components shall include, but are not limited to hardware, hinges, sweeps, etc.

7. Spare Parts

- Determine if spare parts are required for the project. If required, provide a list of spare parts in the specifications.

**3.1.3 Requirements for As-Built Drawings**

Electronic CAD files with separate layers for access control along with separate Access Control drawings shall be submitted with Record Documents.

Exterior Door  
Numbers  
determined no later  
than end of Design

Documentation and  
Archiving  
See Section 1.8

## 3.2 Exterior Door Design and Materials

Reference Section 3.1 Access Control Standards and Section 1.9 Accessibility.

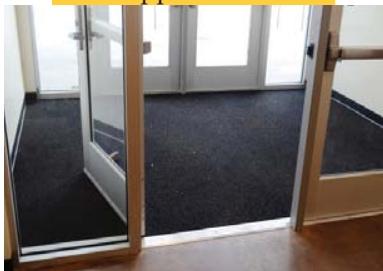
1. The minimum door size is 3'-0" x 7'-0". If double doors are used, the center mullion must be removable.
2. All exterior doors to be insulated and fully weatherstripped and all frames (unless hollow metal) are to be thermally-broken.
3. Hollow metal doors shall have a 18 gage minimum facing skin, galvanized, and 1 3/4-inch minimum thickness. Hollow metal frames shall be 16 gage minimum and shop-galvanized. Door frames shall be full weld construction; knock-down frames are prohibited.
4. Anodized aluminum or prefinished aluminum are acceptable materials for the primary entrance doors. Major portions of the door sections shall have .188-inch wall thickness. Continuous hinges shall be used for all aluminum doors.
5. Prevailing wind patterns are to be considered when determining door swings of exterior doors.
6. Exterior wood doors are prohibited unless a part of a historic renovation / addition project (See Section 7.0 Historic Buildings).

### 3.2.1 Review and Documentation

Prior to shop drawing submission by the Contractor, a hardware coordination meeting is to be scheduled with the Project Manager, user groups, Facilities Services Locksmith and the Contractor to discuss project-specific issues related to lock functions, coordination and delivery. Reference Appendix 3.2-1 Door Documentation Checklist for submittal requirements.

### 3.2.2 Door Hardware

Reference Section 4.1 Door Hardware Standards and Appendix 3.2-2 Door Hardware.



### 3.2.3 Installation of Doors and Door Frames

1. Side jambs to be set plumb and straight. Head jambs to be set level and straight.
2. Wood jambs to have blocking at a minimum of five points on each side placed between jamb and framing member, include blocking behind each hinge and lock strike plate. At no point on side jambs or head jambs shall the distance between blocking exceed eighteen inches. Jambs to be securely fastened at blocking points, to framing members.
3. Metal frames to be installed as per manufacturer's written specifications. If filled with concrete or grout, block-outs or insulating foam blocks to be placed behind hardware attachment points on frame to facilitate drilling and tapping for bolts or crews.
4. Clearance between door and jamb shall be 1/8-inch plus or minus 1/32-inch. Clearance between door and door stop shall be 1/16-inch with door in the locked position. Floor clearance shall be 1/4-inch plus or minus 1/16-inch above finish floor material. Wood doors shall be beveled 3 degrees on both hinge side and lock side.
5. Weather-strip or smoke-seal applied to door or door frame shall not interfere with the proper operation of door.
6. The threshold for exterior doors that access rooftops shall be set twelve inches minimum above the roof.

### 3.3 Windows, Storefront and Skylights

Special care shall be taken when designing window, storefront and skylight systems. The climate at MSU requires specific detailing to withstand wide fluctuations in temperature, high levels of snow and wind-driven rain. Special attention to the detailing for sealing and flashing of all fenestrations is critical to the success of the opening and wall system. Total area of openings must be considered for its impact on heating and cooling loads.



Roof Access Doors  
-Sills required to be 12 inches off roof surface

Door Hardware  
Specifications  
See Appendix 3.2-2



### 3.3.1 Energy Requirements

Window, storefront and skylight design and construction shall comply with IECC (International Energy Conservation Code) and State of Montana high performance building standards. The minimum U-factor designated by the IECC shall be the bases of design. Spray-foams shall be used to seal the perimeter of windows meeting the required r-value, while making sure weeps built into the windows remain free and open.

When designing the placement of fenestration systems, the Design Consultant is to take into consideration the level of shading required and/or the glazing shading coefficient, a higher shading coefficient on higher solar exposure sides, and the addition of shading devices for south and west facing windows.

### 3.3.2 Windows

1. Aluminum and aluminum-clad windows are acceptable window constructions. Aluminum-clad windows are used primarily in Historic preservation projects, but may be incorporated into other projects at the discretion of the University Architect.
2. Vinyl windows and wood windows shall not be used.
3. Aluminum windows shall have thermal break frames and insulating glass.
4. Operable and fixed windows are acceptable window types. The Design Consultant shall review window types during Design Development with the Project Manager and Facilities Services.
5. Operable windows may include awning, casement, sliding or single/double hung operations. The Design Consultant shall review the advantages and disadvantages of each operation with the Project Manager and Facilities Services before determining the most appropriate for the project.
6. Crank operators shall not be used on operable windows.

Reference Section 7.0 Historic Buildings.



Sustainable Building  
Principles  
See Section 1.6

Translucent Skylight



### 3.3.3 Storefront

1. All storefront shall have thermal break frames and insulating glass.
2. Storefront framing sections shall be .080-inch minimum wall thickness with snap-on glazing trim of .050-inch minimum wall thickness.

Reference Section 3.2 Exterior Door and Appendix 3.2-2 Door Hardware.

### 3.3.4 Skylights

Skylights are acceptable if access is provided. The Design Consultant shall review the means of access with the Project Manager and Facilities Services.

1. All skylight systems shall have thermal break frames and glazing designed to meet IBC requirements.
2. All skylights shall have internal condensate drain systems.
3. There is to be an 18-inch minimum curb height measured from roof plane to lowest point of skylight frame.
4. West and south facing skylights shall be designed to reduce unwanted heat gain.

### 3.4 Roofing

These standards apply to new and replacement roofs for academic, administrative, athletic, and residential buildings on MSU's campus. For agricultural buildings, the Design Consultant shall consult with the Project Manager and Facilities Services for requirements.

#### 3.4.1 Review Guidelines

Preliminary design and material selection for roofing shall be reviewed by the Project Manager, the University Architect, and Facilities Services in Schematic Design when the roof shape has been determined.

#### 3.4.2 Guidelines and Requirements for Documentation

1. The Design Consultant shall provide the following documents (as minimum requirements) at the appropriate phase of the project. Reference Appendix 3.4-1 Roofing Documentation Checklist.
2. Roof plan showing roofing materials, slopes and location of drains, equipment locations, roof accessories, and other roof penetrations.
3. Project-specific details of the roofing systems and intersections to adjacent construction (parapets, skylights, equipment, expansion joints, etc.)
4. If applicable, details showing U.L. assemblies required to meet fire rating requirements for roofing system.



Roofing Review  
-Roofing design and material selection reviewed by University Architect during preliminary design

Window Standards  
See Appendix 3.3-1





### 3.4.3 Guidelines for Installation and Performance – Roofing

Of prime importance to MSU is the type of roofing material, the quality of the initial roof installation and the provision of a long life warranty for any roofing system installed on campus.

1. For low slope roofs, a fully-adhered, EPDM, black, single-ply membrane roofing system is preferred. Other types of single-ply roof membranes are acceptable, including PVC and TPO, where appropriate. The Design Consultant shall present the best material for the specific installation and budget for the university's review.
2. The roofing installer shall have a record of a five successful installations (minimum) of similar roof installations in the previous five years where the roofing manufacturer has provided supervision during installation.
3. The following warranties are to be provided in the specifications:
  - A. Minimum warranty for low-slope roofing systems is 15-year, no limit, full system warranty.
  - B. Minimum warranty for manufactured, pre-formed metal panel roofing systems is 20-year, non-prorated water tightness and finish warranties.
  - C. Minimum warranty for three-tab fiberglass or dimensional shingle is 25-year, full system warranty.
4. Roof decks: concrete or steel decking is the preferred decking material, sloped to drain. If sloped deck cannot be used, a flat deck with tapered insulation or another material meeting the construction classification required for the building may be considered (Consult with the Project Manager).
5. If there is a mechanical penthouse in the project, the floor of the penthouse should be concrete; a steel roof or roof deck is acceptable over the penthouse.
6. Insulation: Roof insulation is to be part of the roofing system and is to be covered by the roofing warranty. Point loading and uniform loading requirements must be considered in the choice of insulation material and method of installation. Insulation must meet current IECC and State High Performance Building standards for minimum and average thickness and R values. Insulation is to be installed in two layers with staggered joints; insulation is to be fastened to a vapor barrier using 'fasten free' adhesive, and successive layers of insulation are to be fastened with the same adhesive.

7. Polyisocyanurate insulation should be covered with 1/2-inch minimum DensDeck (or equal). On structure without slope, insulation is to be tapered to roof drains; roof drains are to be installed in 4-feet by 4-feet sumps to provide positive flow to the drains.
8. Through-wall/counter flashing is to be receiver-type to allow for re-roofing. Flashings are to be locked and soldered at seams and corners. Flashings at roof penetrations, curbs, and transitions should extend up a minimum of 8-inches above the surface of the roof. Coordination of through-wall flashing is very important. For through-wall flashing, details shall eliminate the need for sealants: sealant or caulking are not to be relied on for water-tightness.
9. At parapets all drains shall have an overflow scupper to divert water off the roof in times of drain blockage. Overflows shall be 2-inches minimum, below lowest point of base or wall flashing.
10. Metal copings should be designed to allow for expansion without bending or flexing. Expansion joints should be installed within four feet of corners and at every third joint along walls (at twenty feet on center +/-). Use loose-locked-and-caulked joints or use splice joints for expansion. All other joints are to be drive locked. Premolded corners shall be used. Use concealed cleat on exterior and gasketed fasteners at roof side of parapet.
11. Stone copings at parapets and other locations shall be installed over through wall flashing.
12. Due to the increase in the number of penetrations and to minimize foot traffic on the roof, installation of equipment on a low-slope roof is to be avoided if possible. Where equipment must be installed on a roof, NRCA design considerations are to be followed. Clearance requirements for ease of re-roofing are to be met; equipment supports are to be detailed so that re-roofing can be easily accomplished. Curbs are to be 18-inches minimum (24-inches preferred) and use of pitch pockets is to be avoided. The location of equipment shall be coordinated with the location of the roof drains to provide a minimum of six feet separation.
  - Prefabricated walks are to be provided with the roof for maintenance access to the equipment and to roof hatches or access points.

Coping Joints  
-Shall be drive locked where fixed

Masonry Copings  
-Install masonry copings over through-wall flashing

Equipment on Flat Roof  
-Avoid installation of equipment on flat roof areas



Manufacturer's  
Warranty

-Shall include all  
materials and labor  
for the term of the  
warranty

Steep slope Roofs  
need an ice shield over  
entire roof

Utilize cold roof  
design where possible



13. For steep-slope roofs, metal roofing, slate and asphalt shingles are acceptable materials. Synthetic slate products are discouraged. Attic stock of replacement slate or shingles shall be specified.
  - A. All steep-slope roof areas should have continuous ice and water shield under all of the roofing material. Saturated asphalt felts or an approved synthetic underlay with a rosin slip sheet are the typical underlayment for most pitched roofs, with a rosin slip sheet used between felts and metal roofing material.
  - B. Codes require eaves and other areas subject to the effects of ice dams to be protected with cemented underlayment or waterproofing membrane. A self-adhering, self-sealing membrane is the preferred ice shield. Ice shield is preferred over the entire pitched roof.
    - i. Cold roof design – where possible implement a cold roof design with two-way ventilation.
    - ii. Determine if lighting protection is required during Schematic Design.
    - iii. For membrane roofs, full-time jobsite inspection by the manufacturer's trained representative is required.
14. Flashings are to be 20-ounce minimum or equivalent for standing vertical flashings, valley, through-wall flashings, and areas subject to excessive wear. Materials, including slates, shingles, felts, metals, fasteners, etc. are to comply with the requirements of the NRCA Roofing and Waterproofing Manual and the SMACNA Architectural Sheet Metal manual, and be fabricated and installed in compliance with good practice and the details listed in Appendices.

#### 3.4.4 Guidelines for Protection and Maintenance

Roofing specifications for work, to or around existing roof areas, are to contain the following statement: "The Contractor shall not move equipment or materials over, or in any way modify the existing roofing that will remain during or after the completion of roofing work unless the roofing is fully protected from damage. The Contractor will be responsible for repair or replacement of defective material, improper installation, or damage resulting from work performed through the project prior to MSU accepting the roof as completed".

All new roofs are to be designed for ready access to all areas during adverse weather conditions with a minimum use of portable ladders or other lift conveyances.

### 3.4.5 Design Guidelines for Safety in Roofing Maintenance

The Design Consultant is to consider requirements for safety in the maintenance of the building in designing the roof for the building. During the Design Development phase, consideration is to be given to providing parapet walls for low-slope roof areas to ensure that OSHA recommendations for maintenance on roof areas can be met. The Design Consultant shall review proposed solutions with the Project Manager and Safety & Risk Management.

Fall protection systems, where needed, in the absence of parapet or other structural components, are to be installed in new construction projects and in major renovation / alteration projects. The need for fall protection will be reviewed and determined if required for reroof projects. An alternative may be a built-in system of permanent mounting points for safety railing.

### 3.4.6 System Evaluation

The Design Consultant responsible for the roofing design shall evaluate and specify the roofing system for:

1. Fire resistance rating
2. Wind uplift resistance
3. Warranty
4. Tear resistance
5. Resistance to harmful local chemicals
6. Membrane compatibility with insulation
7. Type of membrane seams and joints
8. Flexibility / Elongation Coefficient
9. Resistance to hail damage

Masonry  
See Section 3.5

### 3.4.7 Guidelines for Installation and Performance – Waterproofing

The preferred method for waterproofing horizontal areas below grade is a loose-laid single-ply PVC membrane.

1. Below-grade structures: When applying a horizontal membrane over below-grade structure (particularly in cases where plantings or “soft” cover are planned as a top surface)
  - A. a 4-inch concrete protection slab should be applied over drainage mat and filter fabric, which in turn is installed over the waterproofing layer. This will ensure protection of the treated areas from penetration by fencing, tent spikes or the like.
  - B. The added depth of the lab should be taken into consideration when planning grades and planted areas.
2. Below-grade penetrations: for piping, conduit, and similar services,
  - A. individual sleeves for each pipe are to be installed in new construction, and individual cores for each pipe in existing construction are to be used.
  - B. Penetrations are to be spaced to allow a minimum of 6-inch clear area in all directions for proper application of waterproofing assembly; a 4-inch conduit, for example, will require a frame approximately 16 inches in diameter.
  - C. Clear space requirements for adjacent penetrations are allowed to overlap one another.
  - D. Space between core or sleeve and conduit or pipe is to be sealed with a mechanical link-type seal. Any deviation must meet with the approval of the Project Manager.
  - E. The exterior wall at the penetration is to be primed and coated with a bitumastic waterproofing membrane. The bitumastic is to be formed around the pipe or conduit, and outward 4-inch to allow a stainless-steel clamp to be installed around the extended membrane.
  - F. Termination bars are to be applied, picture-frame style, to finish the edges of the membrane.
3. Refer to code requirements as needed for utility penetration spacing where these pass through foundation walls. Where MSU requirements exceed code requirements, spacing is to meet the more stringent requirement.
4. Concrete or CMU foundations: when concrete or CMU foundations are part of the waterproofing design, ensure proper curing, cleaning and preparation of the wall prior to the application of the bituthane waterproofing system and subsequent mirror drain fabric.

Refer to section 3.5 Masonry for specific detailing required to ensure proper waterproofing of masonry systems.

### 3.4.8 Requirements for As-Built Drawings

Reference Appendix 1.8-2 Record Documents Requirements



### 3.5 Brick

The color, size, texture, bonding patterns, and construction methods of buildings with brick have varied as availability, architectural style, and preferences have changed and evolved throughout the history of design and construction for at MSU.

1. During the Schematic Design phase, the Design Consultant shall select brick, mortar and joint tooling for the project, in context with surrounding buildings or LRCDP neighborhood, and what is appropriate for the design of the project. The selection is to be approved by the University Architect.
2. If fewer than three brick manufacturers and/or mortars are selected, performance specifications for size, type of brick, color, range, strength and permeability shall be used, citing as the basis of design of one or more manufacturer's brick products.
3. Additions to existing buildings shall match the existing brick in size, color, texture, unless otherwise directed.
4. Standard and oversized bricks are acceptable. The primary bonding pattern shall be running bond, unless otherwise directed.

#### 3.5.1 Guidelines for Installation and Performance

Particular care is to be taken in designing interfaces of masonry anchorage systems and in placement of through-wall flashings to bring any water that penetrates the system out to the exterior.

1. Flashing pans with welded seams are to be installed beneath all sills at openings in masonry veneer walls. A reliable flashing and weep system is to be designed for the wall, including a mortar suspension system to prevent mortar build-up in the cavity and at the weeps.
2. If a relatively porous material is to be used to face the building (such as limestone, brownstone, and some types of brick), the concrete foundation wall or a nonporous material (such as granite) shall extend 8" (min.) above finish grade.
3. All parapet walls up to 3'-0" height above roofing shall be flashed from coping to roofing.
  - A. The inside face of parapets exceeding 3'-0" height above roofing shall be of an approved material other than exposed concrete masonry unit.
  - B. Metal or stone are acceptable materials for coping (brick is not permitted).

Documentation and Archiving  
See Section 1.8

Historic Buildings  
See Section 7.0

Weep System  
Required



4. All through wall flashing shall be 16 oz. minimum copper or equivalent fabric coated copper. Other metals, vinyls and plastics shall not be used.
5. If masonry work is planned as part of a 'rain-screen' system (or if metal or glass panels are planned as part of a combined masonry / metal / glass rain-screen system);
  - A. the Design Consultant is to review proposed system and proposed waterproofing techniques with the Project Manager, the University Architect and Facilities Services.
  - B. It is expected that redundant systems will be included as part of the design, so that the failure of the primary watershedding system will not result in total system failure.

### 3.5.2 Garden or Landscaping Walls

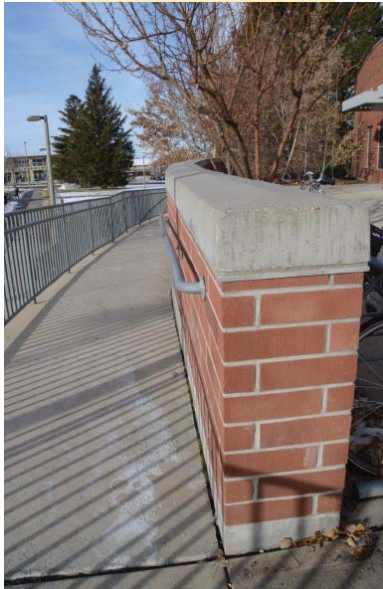
Garden or landscaping walls should have through-wall flashing under the coping to prevent water penetration that can damage the wall.

1. Stone is an acceptable material for coping (brick is not permitted).
2. Mortar joints of the coping are to be raked then caulked.
3. On stone walls, specify through-wall flashing near the top of wall under stones, using lead flashing to conform with irregular shapes.
4. If over an occupied space (below) set through-wall flashing at waterproofing level in addition to coping detail.

### 3.6 Exterior Paint

Exterior painted surfaces are to be avoided if possible. The Design Consultant shall review all areas of exterior painted surfaces to determine if other options are available.

1. Proper preparation, cleaning and priming of surfaces are essential to a durable exterior paint application.
  - A. The Design Consultant shall review the specifications with the Project Manager and Facilities Services during the Construction Document phase.
  - B. The specifications shall include a pre-installation conference.
2. Use a high-gloss or semi-gloss sheen for exterior painted wood trim, doors, and windows. If clear stains are necessary because of historical preservation requirements, use a gloss, high-solids polyurethane stain.
3. For exterior painted metal, proper preparation and priming is critical. Ensure that primer is compatible with the finish specified. Higher gloss finishes are preferred on metal and wood for longevity of finish.



Rainscreen Systems:  
System design review  
required

Through wall flashing  
below wall coping

### 3.7 Exterior Metal Siding

1. Prefinished aluminum or steel, zinc and copper, or composite panels are acceptable materials for exterior metal siding.
2. Metal siding panels may be the primary weather barrier or may be part of a rainscreen type system. The type of panel should be chosen to meet the aesthetic requirements of the building, including
  - A. panel size
  - B. panel length, fastener system
  - C. the type of seaming from panel to panel
  - D. Care must be taken with flat panels and larger panels to assure that unacceptable “oil canning” does not occur.
3. Appropriate gauge of metal must be specified for location and exposure to ensure long service life and to resist environmental factors such as exposure to ice and hail.
4. Metal panel connection and joinery must be carefully considered due to high degrees of expansion / contraction and large numbers of freeze / thaw cycles especially on south and west facing wall exposures.
5. Metal finishes must be carefully specified to resist environmental factors such as temperature extremes and severe UV exposure. Warranties shall include
  - A. fading or degradation of metal finishes
  - B. installation
  - C. material replacement.
6. Metal panel systems should include a minimum of sealant joints that require periodic maintenance and replacement for the life of the building.

### 3.8 Insulation and Vapor Barriers

1. MSU’s climate is considered Cool-Dry by the International Energy Conservation Code (IECC). The campus climate requires great attention to detailing of insulation and moisture control for the building envelope.
2. The Design Consultant shall meet or exceed the current Energy Code and State High Performance Building requirements for insulation of the building envelope.
3. MSU’s climate zone requires Class I or II vapor retarders provided on the interior side of exterior walls. Vapor retarders are to be installed per the manufacturer’s requirements.



### 3.9 Flashing

#### 3.9.1 Metal Flashing

1. Design flashings to resist oil canning.
2. All flashing details are to be shown in the 50 percent Construction Document phase submittal.
3. All concealed and exposed flashings shall be included in details and clearly coordinated with the Specifications.
4. Use 3D details where appropriate to show proper fabrication and installation of flashing and counter flashing.
5. Flashing at masonry walls should have reglets or termination bars.
6. Steel flashings should only be used when they are required to match steel siding products. Steel flashings shall be prefinished with the same quality finish as the siding. Galvanized steel flashing should be avoided.
7. Prefinished or anodized are acceptable finishes for aluminum flashings are the most common flashings for different roofing types.

#### 3.9.2 Flexible Flashing

1. Flashing at single ply roofing shall match the roofing material.
2. All flashing must be reviewed and approved by a manufacturer representative during construction and at the completion of the roofing installation.
3. Concealed flexible flashing should typically be PVC.
4. Flexible copper flashing should be avoided.

#### 3.10 Hazardous Materials

Reference Section 4.10 Hazardous Materials

**END OF SECTION 3.0**



Review of Flashing  
Details

-Flashing details to be  
shown on 65 percent  
review drawings







Access Control  
Systems  
See Section 3.1

-Design Consultant shall have "first pass" at hardware schedule and specification for 65 percent Construction Documents

-A complete and full Hardware Schedule and Specifications are required at 95

#### 4.0 Building Interior

1. In general, building entrances, lobbies and significant public areas require design input and approval by the University Architect, coordinated by the Project Manager. The University Architect may designate other building areas to be included.
2. Materials, finishes, and colors shall be recommended by the Design Consultant, with the involvement of the Building Committee and, when required by the University Architect.
3. As a public institution, extravagant and/or higher maintenance interior finishes are discouraged. Areas are likely to remain in the same use for 10 or more years and require durable, lower maintenance finishes.
4. Interior flooring and ceilings shall be selected from manufacturer's standard material selection.
  - A. Custom material selections are prohibited, regardless of initial lower costs resulting from significant quantities.
  - B. Future replacement or matching materials are an unnecessary premium in cost.
  - C. Custom material selections may only be used with prior written approval.

#### 4.1 Door Hardware Standards

Reference Section 3.1 Access Control Standards, Section 1.9 Accessibility, Appendix 3.2-1 Door Documentation Checklist for submittal requirements, and Appendix 3.2-2 Door Hardware

1. Early in the planning stages of the project, the Design Consultant must meet with the Project Manager and with the Facilities Services Locksmith to review both the design standards and the program needs for locks and hardware in the proposed project.
2. Prior to shop drawing submission by the Contractor, a hardware coordination meeting is to be scheduled with the Project Manager, user groups, Facilities Services Locksmith and the Contractor to discuss project-specific issues related to lock functions, coordination and delivery. The specifications shall include a pre-installation conference.
3. MSU allows door hardware from a number of manufacturers, however because of ongoing maintenance needs and normal modifications for certain components of door hardware within buildings, it is important that the Design Consultant specify the stipulated manufacturers.
4. For renovation work, the Design Consultant shall not reduce the level of quality or service provided by existing hardware when specifying replacements without prior approval by Project Manager.

#### 4.1.1 Key Schedule and Core Installations

1. All cores will be combined and installed by MSU Facilities Services Locksmith unless directed otherwise by CPDC.
2. The Design Consultant is to arrange a meeting with the Project Manager, the departmental representative for the project, the Facilities Services Locksmith, and a representative from the door hardware supplier prior to the shop drawing submittal phase of the project. The purpose of the meeting is to confirm requirements for lock function, keying and for levels of master keying and sub-masters, and any access control issues. The lock supplier is to deal directly with the Facilities Services Locksmith for sequencing requirements.
3. Room numbering and room designations used in the key schedule are to be consistent with those used in fire alarm nomenclature (See Section 5.1 Information Technology and 5.3 Heating Ventilation and Air Conditioning).
  - A. Facilities Services Lock Shop is to prepare the key schedule for review by the other parties, and is to proceed with setting up lock cores upon receipt of the approval key schedule.
  - B. The contractor is to supply one key per core minimum
  - C. Residence hall projects will require three keys per lock.
4. Facilities Services Locksmith shall be given 4 weeks notice to schedule the installation of the cores in the finish hardware.
  - A. It is critical that the specification require that the contractor retain all factory-supplied lockset tailpieces needed for lock core installation.
  - B. Tailpieces are to be turned over to Facilities Services Locksmith for core installation.
5. Specifications are to include requirements for employing only experienced, qualified mechanics for installation of finish door hardware.



Access Control  
Systems  
See Section 3.1

Door Hardware  
Specifications  
See Appendix 3.2-2

#### 4.1.2 Electrified Hardware and Access Control Considerations

Refer to Section 1.12 Security for guidelines to establish general security goals for the project.

Campus Access Control System (CACS) Hardware Specifications – Electromechanical (See Section 3.1 for Access Control Systems guidelines for exterior doors) as follows:

1. Door mounting configurations shall be RIM (See Appendix 3.2-2).
2. “Request for Exit” (RX-LC) switch requirements shall be addressed during the 50 percent construction drawing door schedule “first pass” meeting and will be implemented on a per project basis.
3. Magnetic locksets must be equipped with key bypass.
4. Hardware, Panic bar, trim styles and finishes to be specified by the Design Team Standard specifications and series numbers for hardware, trim styles and finishes (See Appendix 3.2-2).
5. Panic Hardware
  - A. All electromechanical Panic Hardware shall be manufactured by Von Duprin.
  - B. Panic Bar with Electric Trim Release (24V Fail-Secure Operation) this type of hardware has the locking function in the outside lever trim. Electrical solenoid activation releases the locking mechanism allowing the lever handle to withdraw the door latch. This type of locking hardware is standard on all exterior dormitory doors. Key override shall be “Night Latch” function (NL).
  - C. A Van Durpin Power Transfer Device shall be included with each panic bar installation.

6. Panic Bar with Electric Latch Retraction (24V Fail-Secure Operation).
  - A. This type of hardware has the locking function in the bar. A special high current power supply is required to retract the door latch. This allows for the use of standard pull handles as outside trim. Commonly used on the exterior doors of Administrative and Academic buildings. Required on all ADA motorized doors, Key override shall be "Night Latch" function (NL).
  - B. The following equipment shall be included with each EL panic bar installation: A) Von Durpin Power Supply. Double leaf doors require one power supply. B) Von Durpin Power Transfer Device.
7. Panic Bar with Delayed Egress function
  - A. This type of hardware has all the same requirements of a standard latch Retraction panic bar but with a "Delayed" action release scheme when exiting. Building code requires that the hardware must be interconnected with the Fire Alarm System for immediate release in case of fire.
  - B. The following equipments shall be included with each CX bar installation: A) Von Durpin Power Supply. Double leaf door only require one power supply. B) Von Durpin Power Transfer Device
  - C. Mortise Lockset Hardware (24V Fail-Secure Operation)
  - D. Electrified mortise locksets are typically not used by MSU. As an option for Access Controlled doors that don't require panic egress Mortise Lockset may be used. Key override shall be "Night Lath" function (NL). A "Door Status" monitor switch (DSM) shall be provided. The manufacturer of choice shall be Best.
8. Cylindrical Lockset Hardware (24V Fail-Secure Operation)
  - A. Electrified cylindrical locksets are only to be used on Access Controlled doors in place of the mortise type when there are specific Architectural constraints. Key override shall be "Night Latch" function (NL). The manufacturer of choice shall be Best.
  - B. Motorized Door Operators (ADA)
    - LCN is the overhead operator manufacturer of choice. NO SUBSTITUTIONS.

#### 4.1.3 Requirements for Mechanical Rooms, Penthouses, Roof Access

Specify cylindrical lockset with storeroom function. If padlocks are to be used (on roof hatches, e.g.), specify Master Locking interchangeable-core padlocks; use weathertight locks for exterior applications. American manufacturer may be used on interior applications, to be approved by Facilities Services Locksmith. All padlocks must be equipped with a key override.

#### **4.1.4 Millwork and Cabinetry Locks**

Specify National or Timberline deadbolt or dead latch cabinet locks for custom cabinetry or millwork applications. The use of Best for custom applications requiring interchangeable cores is to be determined by use group.

Media Services lecterns and media cabinets are to be keyed with a media module.

#### **4.1.5 Access Panel Locks**

Access panels are commonly used for the maintenance of building utilities and are typically required to be locked. Those which exist in maintenance (non-public) areas do not require locks; those in public spaces are required to be lockable. Exceptions may be made in the case of very high ceilings (above 9 feet) or other unusual locations and shall be reviewed by CPDC.

Depending on the access panel manufacturer, locks should be Best rim cylinder or mortise cylinder.

#### **4.1.6 Requirements for As-Built Drawings**

Reference Appendix 1.8-2 Record Documents Requirements



## 4.2 Elevators

The following standards set forth the criteria to be utilized by the Design Consultant for the installation of new elevators at MSU. The standards have been prepared for use by Design Consultants to properly specify in-ground hydraulic elevators and geared traction elevators in a manner satisfactory to MSU. The Elevator Requirements for hydraulic and geared traction elevators in Appendix 4.2.1 shall be utilized as a reference in preparing the Contract Specifications for all elevators. Although the standards apply specifically to new elevators, they shall be used as a reference for upgrading existing elevators.

### 4.2.1 Review and Procedural Guidelines

1. Early in design development the Design Consultant should arrange a meeting with the Project manager and the Engineering and Electrical foreman to discuss the programmatic requirements of the proposed elevator, and to begin to set technical requirements. The meeting should be followed up with a review session with the same attendees and the City of Bozeman Building Department.
2. At 65 percent completion of contract documents for the project, the mechanical design of the elevator should be nearly complete and the architectural and MEP coordination required for the installation of the elevator should be included with the contract documents in the 65 percent review.
3. Shop Drawings are to be submitted to the Design Consultant, who is to forward the submission to the Project Manager. Note that elevator plan review and inspections at MSU are performed by the City of Bozeman Building Department and the Montana Department of Labor and Industry (DLI).
4. The Project Manager will return any comments to the Contractor who makes the official review submittal to the Montana DLI. Shop Drawings for permit review must be signed and sealed by a licensed design professional.
5. A copy of the shop drawings is also to be provided to the Project Manager for review by Facilities Services.



Montana DLI to review elevator permit.

Provide a copy of Shop Drawings to FPDC Project Manager for review by Facilities Services

#### 4.2.2 Design and Installation Guidelines – General

1. All general purpose elevators shall serve both to transport passengers and to transport furniture and equipment typical to the function of the building. Determine if the building requires a passenger and a freight elevator in the Programming phase.
2. Elevators shall service all floors of a building, including basements and penthouses if possible. Access to floor may be limited, if necessary, by key switches or access control card readers. Review requirements for limiting access with Project Manager.
3. Travel distance up to 4 stops: The typical general purpose elevator type to be used in academic and student residential buildings is the electric “Machine Room-Less” (MRL) type, such as the Otis “Gen 2” system, the Kone “MonoSpaces/EcoSpace” system, and the ThyssenKrupp “Synergy” system, among others. Other manufacturers and elevator series are to be approved if equal.
4. Travel distances above thirteen stops: Use of geared traction required. Design to be determined per project.

#### 4.2.3 Design Requirements for Hoistway Entrances and Cabs

1. The Design Consultant should determine early in the design process if the elevator will be used as an accessible means of egress. Elevator design must meet all state and local codes regarding accessibility for the required height and number of floors served.
2. Hallway doors are to be stainless steel finish unless specifically stated to be otherwise.
3. Cab doors are to be stainless steel finish unless specifically stated to be otherwise.
4. Cab wall finishes at passenger elevators are to be solid surface panels if available, or high pressure plastic laminate if not. Stainless steel guard rails are to be provided.
5. Cab wall finishes at freight elevators are to be baked enameled steel panels with stainless steel guard rails.
6. The cab for both passenger and freight elevators are to be fitted with studs for moving blankets and blankets are to be provided.
7. Standard cab lighting is to be a luminous ceiling type, LED if available. The preference for cab lighting is 4-foot fluorescent fixtures connected to the emergency system.
8. The flooring material for the cab shall be appropriate for the amount of passengers, and the type of use.



#### 4.2.4 Design and Installation Guidelines – Elevator Machine Rooms

It is the goal of MSU to design and layout elevators to be Machine Room-Less. If there are restraints within the project that do not allow Machine Room-Less elevator design then the elevator machine room shall be designed and constructed in accordance with the requirements of the IBC.

1. The elevator machine room shall be adequately ventilated and accessed by means of an outwardly swung fire rated door measuring at least 3 feet by 7 feet. The door must be outfitted with a spring closer to lockset. The lockset installed on the elevator machine room doors shall be keyed like the MSU's other elevator machine rooms and shall automatically lock when closed (See Section 4.1 of these guidelines for further door hardware standards).
2. Two elevator hoistway door keys shall be provided in a key case or box mounted to the wall in the elevator machine room, located in close proximity to the main power disconnect.

#### 4.2.5 Design and Installation Guidelines – Elevator Hoistway and Pit

Elevator hoistways and pits shall be designed and constructed in accordance with the requirements of the IBC. The sizing of hoistways and pits are to conform to the manufacturer's requirements.

#### 4.2.6 Design and Installation Guidelines – Related Work

For proper installation of an elevator, appropriate related work must be included in the project. The following list, including but not limited to, contains some of the work needed to be included in other sections of a project specification:



Reference IBC and other jurisdictional codes for compliance with elevator standards  
Machine-Roomless Elevator design is preferred

Final testing to be witnessed by the Project Manager

Contractor to perform on-site training of elevator

1. Smoke and heat detectors shall be installed per the American National Safety Code for Elevators, ANSI A17.1 (latest edition accepted by the State of Montana) and interconnected with the fire fighter provisions of the elevator's control system. Smoke detectors shall be installed at the top of the shaft, in the elevator machine room and at the interior elevator lobbies and shall be the sole devices to initiate Phase I Elevator Recall. Heat detectors shall be installed in elevator machine room, at top of hoistway and in hoistway pit. In a building equipped with sprinklers, any sprinklers installed in the elevator shaft must be protected from freezing.
2. A shunt trip circuit breaker shall be provided on the main power feed to the elevator any time the hoistway and/or elevator machine room is sprinkled. Anytime the elevator hoistway or machine room is sprinkled, a rate of rise / fixed temperature heat detector shall be installed in close proximity to each sprinkler had and wired to the main power shunt trip circuit breaker. Activation of heat detector shall cause the main power to the elevator to disconnect. Fire service key switches will be available at each elevator inside of key lock boxes. Fire department will have key to lock boxes (all keyed alike).
3. Cab Telephones – all cabs must be equipped to accept an elevator telephone as specified by the elevator guide specifications, which have been coordinated with the Information Technology Center (ITC). Accommodation for mounting the telephone must include holes tapped to accept standard mounting machine screws.

#### **4.2.7 Requirements for Testing and Training**

The elevator subcontractor is responsible for conducting the final acceptance test with the State inspector, with a representative of the university's elevator maintenance shop in attendance. The Project Manager is to be advised of the schedule for inspection and testing.

1. The procedure for testing shall be followed closely in accordance with code requirements.
2. The Project Manager is responsible for witnessing and approving the acceptance test. The elevator subcontractor shall certify the report of the test data, and shall deliver a signed and sealed copy to the Project Manager prior to final payment.

3. At a minimum, prior to seeking final acceptance of the completed project as specified by the contract documents, the contractor shall conduct a comprehensive training program on-site with university elevator maintenance personnel. The session shall provide instructions on the proper safety procedures to be utilized in assisting passengers that may become entrapped inside the elevator car. The session shall also provide instructions on the use of each control feature and its correct sequence of operation. Control features covered shall include, but not be limited to, the following:
  - A. Independent service operations
  - B. Emergency fire recall operations, Phase I
  - C. Emergency in-car operations, Phase II
  - D. Emergency power operations, if applicable
  - E. Emergency communications equipment
  - F. Security operating features
  - G. Interactive systems management, if applicable
  - H. Remote monitoring / controls, if applicable

#### **4.2.8 Requirements for As-Built Drawings**

Reference Appendix 1.8-2 Record Document Requirements

The operating and maintenance manual is to contain

1. wiring diagrams,
2. parts list
3. list of recommended spare parts
4. list of manufacturers of major components of the elevator
5. operating and maintenance recommendations
6. details of any tie-ins to other systems, such as
  - A. fire alarm
  - B. electric systems, including elevator shaft wiring and details

#### **4.2.9 Non-Conformance with Standards**

Any requests for exceptions to elevator standards at MSU shall be presented to the Project Manager, with written notice detailing the reasons for the requested exception. The Project Manager will review the request with Engineering, the Electrical Shop Foreman, and with the MSUs elevator consultant if deemed appropriate. The exception will be granted only if such action is in the best interests of the university.

#### **4.2.10 Maintenance After Substantial Completion**

Specifications shall require maintenance of the project elevator by a local Elevator Technician (within one hour drive) to be included in initial installation price.



### 4.3 Painting and Staining

#### 4.3.1 Standards for Painting Grounds and Building Maintenance

Paint finishes, once a new building or a renovation project has been completed and occupied, may require frequent maintenance if a building is to be kept presentable. The frequency of maintenance depends on the type of facility, the quality of the finishes and the nature of use, abuse the occupants subject the building to. Regardless of the frequency of maintenance required, the task of repainting a space or a building most often falls to the Facilities Services Painting; rather than to a contractor.

1. It is important for the Design Consultant to know that Facilities Services Painting stocks a limited number of paint colors, has the capability of mixing a fairly wide range of colors, but should not be expected to provide an infinitely varied palette. MSU employs a number of standard colors that are to be used for “common” spaces such as corridors, offices, classrooms, laboratories, residence hall rooms, or other spaces. The Design Consultant is normally allowed greater latitude in selecting colors for spaces such as lobbies, lecture halls, lounges, and similar spaces. MSU has a standard of six paint palettes to be used throughout campus interior use (See Appendix 4.3-2). MSU utilizes the MPI paint system numbering for project specifications.
2. The Design Consultant should attempt to incorporate breaks, reveals, or other architectural details to divide large expanses of painted surfaces, particularly in the vertical direction. This is especially true in high traffic areas, areas using high pigment paints, or locations that are especially subject to abuse. Consider locations of items such as trash / recycling containers relative to accent paint locations, as these areas are subject to frequent marring and require a higher degree of maintenance.
3. Regardless of the colors used in a project, the Design Consultant is expected to produce a color schedule for approval by the Building Committee. This schedule is to be updated at the end of the project and converted into a record of color selections that is turned over to the Facilities Services Painting foreman. A record of all paint information, including color and sheen, shall be included by the Contractor as part of the operation and maintenance manuals.
4. Unless otherwise directed, all excess paint shall be removed from the construction site by the Contractor.

5. The Design Consultant should be aware of MSU's requirements for minimizing the volatile off-gassing compounds (VOCs) in products such as paint finishes, and should specify products accordingly. The preferred manufacturers used for paint are: Benjamin Moore or Sherwin-Williams.
6. Reference Appendix 4.3-1 Interior Paint Palette and Appendix 4.3-2 Paint Finishes Standard.
  - A. In areas of heavy traffic, such as hallways and corridors, consider the use of a wainscot finish (with or without appropriate trim), which would allow for an easily cleaned and maintained finish on the lower surface, and lower luster finish on the upper, reflective area.
  - B. For wood flooring, finishes must meet MSU's requirements for volatile organic compound compliance. Water-based finishes shall be used for private rooms and public spaces such as corridors. Meet or exceed manufacturer's recommended minimum number of coats. To achieve color match, consider staining prior to the application of water-based protective coatings.
  - C. Interior wood finishes require careful review of sanding and sealer procedures as they relate to staining and finish coating. Long-term UV protection is essential.
  - D. If interior walls are exceptionally high (such as atriums or loft areas), consider the installation of a "break" in the upper wall, such as a picture rail or second contrasting color, to allow for less maintenance painting over time.

#### 4.3.2 Special Coatings

1. Long-lasting exterior finishes are encouraged, and special coatings may be specified as part of a planned low-maintenance building project. Among the special coatings that can be used are anodized finishes, tnenic paints, and epoxy paints. Shop-applied special finishes are preferred to site-applied, due to better control of conditions.
2. Exterior metals must be coated, if not naturally weather-resistant such as copper and brass. Steel should be galvanized prior to receiving finishes, unless the specifications for a special coating will not permit galvanizing.
3. Regardless of finish used, manufacturers' instructions for on-site application and touch-up of finishes are to be followed. As part of the submittal process, those instructions are to be provided to the Project Manager, with a copy for the Facilities Services Painting.
4. The use of Anti-Graffiti Paint and coatings are highly encouraged. Consult the Project Manager for required applications.



Paint Finishes  
Standard  
See Appendix 4.3-2

Wainscot in corridor

#### 4.3.3 Requirements for As-Built Drawings

Reference Section 1.8 Documentation and Archiving.

The Contractor shall include in the operating and maintenance manual a detailed schedule of actual paints used in each space of the project, including manufacturer, color name or formula, sheen applied, etc.

#### 4.4 Rough Carpentry and Finish Carpentry

While the Campus Design Guidelines cover basic principles of several different project elements and building blocks, considerations for a host of other issues related to the construction and maintainability of facilities continues to develop. There is a considerable interest in the use of abuse-resistant and sustainable materials and methods of assembly which allow for long-term maintenance and corrective procedures.

This section address preferred construction practices, material selections and methods of assembly which have repeatedly arisen in carpentry tech reviews and reflect the experience gained in maintaining and servicing campus facilities.

##### 4.4.1 Review Guidelines – General

Reference Section 1.9.2 University Review Guidelines

##### 4.4.2 Construction

1. Cold-Formed Metal Framing Assemblies
  - A. 16-inch centers required
  - B. Cold-formed metal, 20-gauge typical
  - C. Refer to SSMA limiting height tables and provide intermediate bracing as required
  - D. Design assembly to meet or exceed IBC

2. Rough Carpentry Requirements
  - Fire-resistant wood grounds, furring, blocking, and nailers required within rated interior steel stud framed partitions to facilitate fastening of interior wood window and door frames
3. Millwork Fabrication Requirements
  - A. Specify compliance with Architectural Woodwork Institute (AWI) "Premium Grade" standards
  - B. Premium Grade" cabinet drawer box construction to be limited to dovetail (multiple or French) or doweled
  - C. Specify "Premium Grade" per HPVA material fabrication standards per ANSI/HPVA HP-1-2004.
  - D. Full overlay cabinet type is the typical standard
  - E. Plywood construction for cabinet carcasses and shelving, typical (no particleboard)
    - i. Veneer core plywood is acceptable complying with American plywood Association PS-1 Standards
    - ii. Hardwood or furniture grade plywood shall be used if cabinet carcass is exposed.
    - iii. High Pressure Decorative Laminates (HPL) shall be used for interior surfaces of cabinetry (no melamine).
  - F. Edge banding at shelving to be hardwood or PVC, minimum of 3mm thick.
  - G. Cabinetry in laboratories shall be all metal construction, have metal panel veneer, HPL
  - H. Drawer fronts are to be secured to drawer box with four screws (minimum), adhesive attachment is not allowed.
  - I. Shelving internal to the cabinet and not in the vicinity of moisture may be Melamine with three mm PVC edge band at nosing.
  - J. Shelving support shall be heavy duty standards and brackets. "Premium Grade" standards require standards to be recessed flush.
4. Countertop Requirements: Refer to Appendix 4.4-1 for substrates allowed.
  - A. Plastic laminate countertops to have 3 millimeter edge banding to match laminate color or solid hardwood nosing. Plastic laminate nosing is not allowed.
  - B. Solid surface countertop are required in wet locations.
  - C. Man-made granites are acceptable countertops
  - D. Laboratory countertops will need to be discussed on a per project bases to determine if a non-acid or acid resistant countertop is required.



Allowable Substrates  
See Appendix 4.4-1

#### 4.4.3 Installation Requirements

1. Specify compliance with AWS “Premium Grade” standards.
2. All millwork applied to existing construction shall be anchored with methods appropriate for the wall construction as well as the anticipated maximum load requirement of the fixture.
3. Toe kicks are to be minimum of four inches
4. Countertops are to be scribed to fit to ensure no gaps remain. Countertops are to be caulked prior to installation of back and side splashes. Back and side splashes to be set on continuous sealant bead. Sealant is required at top of back and side splashes as well.
5. Blocking details and locations are to be indicated clearly on plans / elevations.
  - A. Light Duty – 20-Gauge Steel Flat Stock per SSMA
  - B. Medium Duty – 20-Gauge Steel Stud / Track per SSMA
  - C. Heavy Duty – Wood Blocking
  - D. Extreme Duty (i.e.: grab bars / shower seating) – Solid Wood Blocking
  - E. Blocking, anchoring and fastening methods are to be as tested in accordance with applicable ASTM weight rating standards per applied loads
6. Specify compliance with AWI “Premium Grade” standards for wall-mounted shelving. All shelving and fixtures and/or wall standards applied to existing construction shall be anchored with methods appropriate for the wall construction as well as the anticipated maximum load requirement of the fixture.

#### 4.4.4 Gypsum Wallboard Applications

Refer to ANSI A 137.1 for standard practices pertaining to on site storage and handling.

Specify compliance with ASTM C-1396/C-1396M standards of applicable panel type per location criteria.

1. High impact drywall to be installed up to six feet for areas subject to abuse and high traffic. The Design Team is to review the areas that would require high impact drywall with Project Manager during the Design Development phase.
2. Specify compliance with ASTM C-1047 for wall board system accessories standards and specify structural drywall interior trims with copolymer cores and paper faces. Plastic trims are to be glued, not stapled.
3. Reference Appendix 4.4-3 for requirements for levels of gypsum wallboard finish
  - A. Specify Level #4 decorative wall finishes in critical lit areas including hallways, stairs and common areas where a uniform finish is required. Avoid Level #3 finishes except in mechanical and electrical closets.
  - B. No lightweight joint compound for finish coats.

#### 4.4.5 Ceramic Tile Applications and Shower Installations

Installation to follow TCNA Tile Installation Handbook (current edition) standards of application

1. Ceramic tile is to be installed over cement board in wet locations, no green board is allowed.
  - A. Where possible, specify pre-formed corners and trim units. Where pre-formed pieces are not available, specify a silicone caulk at inside corners (not grout).
  - B. Grout is typically sanded at wet wall applications (anything with less than one-eighth inch joint) and unsanded at non-wet wall applications. Grout should be sealed per manufacturer's recommendations at wet locations.
  - C. Use matching sanded caulk at corners and areas requiring flexibility due to building movement.
  - D. Epoxy Grout is required at wet floor applications and sealed sanded grout at non-wet floor locations.
  - E. Where tile applications meet with dissimilar material (i.e. doorways), provide a raised saddle (one quarter inch above floor elevation).
2. Substrates are to be mold / moisture / mildew resistant, refer to GA-238-03, guidelines for prevention of mold growth in gypsum board.

Gypsum Wallboard  
Finish Standards  
See Appendix 4.4-3





3. Specify adhesive to set tiles less than eight inches by eight inches in floor applications and less than four inches by four inches (nominal) in wall applications.
4. Consider use of floor drains where possible and/or feasible.
5. At all floor penetrations in wet areas use integral water barrier sleeve device.
6. The use of fiberglass unitized shower pans and tub enclosures is prohibited.
7. Specify an anti-fracture membrane beneath floor tiles.
8. Specify a PVC pan with welded corners or fluid applied waterproof membrane beneath tile at wet locations.

#### **4.4.6 Attic Stock**

Specify attic stock requirements for ceramic, ceiling and carpet tiles. Specify that attic stock be separated out and stored off-site upon arrival at the project. Facilities Services may be able to assist in the short-term storage of attic stock if needed.

#### **4.4.7 Firestopping**

Meet UL 1479 and ASTM 814 fire test standards based on the floor and wall assemblies planned.

At fire-rated slab penetrations, there is a preference for the use of integral fire stop.

#### **4.5 Floor Finishes**

1. Floor finishes are an integral part of the design of a space being constructed or renovated.
2. The Design Consultant shall present floor finish options to the Building Committee and Facilities Services during Design Development.
3. All hard surface flooring materials must meet current codes for slip resistance.



#### 4.5.1 Building Entrances

Building entrances should have a built-in walk-off system. In new construction this should be a recessed system. The minimum length for this system should be to fill a vestibule or if there is no vestibule, for 12 feet in the direction of travel.

#### 4.5.2 Hard Surface Flooring

1. Terrazzo, VCT, porcelain tile, linoleum and sealed concrete are acceptable materials for high traffic areas such as lobbies and corridors
2. Ceramic tile and porcelain tile are acceptable materials for toilet rooms and locker rooms. Tiles shall extend to wainscot height at plumbing walls and full height at wet areas.
3. All stair treads, regardless of the finish material of the tread, shall have non-slip nosings.
4. Heavy-duty, seamless flooring (minimum four-inch covered base) and fluid-applied, epoxy-based flooring (extend minimum four-inches up walls) are acceptable materials for wet labs. Sealed concrete is an acceptable material for dry labs. The Project Manager will review the proposed flooring materials with the lab user.
5. Quarry tile, heavy-duty seamless flooring, and high performance architectural epoxy coating are acceptable materials for food preparation areas. All flooring materials in food prep areas shall have minimum six-inch integral cove base. The Project Manager will review the proposed flooring materials with the MSU Registered Sanitarian.
6. Porcelain tile, heavy-duty seamless flooring, sheet linoleum with welded seams are acceptable materials for dining areas. All flooring to have 4-inch covered base.
7. Vinyl composition tile (four-inch cove rubber base) is an acceptable material for general purpose rooms and dry utility areas such as closets, store rooms, fire rooms. All rubber bases to have manufactured outside corners.



Ceramic Tile  
See Section 4.4.7

#### 4.5.3 Carpet

Carpet tiles are the acceptable material for all carpeted areas. Broadloom carpet is discouraged and must be approved by the University Architect. Attic stock of minimum 10 percent of the installed floor area must be provided to MSU at the time of installation.

1. All carpet products should have a high recycled fiber content.
2. Carpet tiles should be rated for heavy traffic with soil and stain protection, solid backing with fabric scrim, minimum 26-ounce face weight, nylon fiber type 6 or 6-6.
3. Tiered rooms may be fully carpeted or carpet only the traffic aisles.
4. If approved, broadloom carpet should be rated for heavy traffic with
  - A. soil and stain protection
  - B. a level loop or multi-level loop design, with minimum 26-ounce face weight
  - C. nylon fiber type 6 or 6-6 solution dyed yarn.
  - D. Broadloom carpet should typically be glued down.

#### 4.5.4 Access Flooring

Certain spaces with increased needs for technology and flexibility may require access flooring. The following characteristics are required by MSU:

1. Class A listing for flamespread and fire resistance
2. 24-inch square panels, steel frame with lightweight concrete fill on adjustable pedestals, compatible with carpet tiles or VCT.
3. Integrated modular system for line voltage and low voltage wiring systems
4. Able to accommodate plenum air supply/return design



## 4.6 Interior Doors

Interior doors to comply with IBC and ANSI operational clearances and size requirements

### 4.6.1 Door Types

All doors shall have a minimum width of 3'-0" and a minimum height of 7'-0". All wood doors shall be five plies, solid core with a minimum thickness of 1 3/4". Specifications shall require a lifetime warranty for wood doors. Rail and style doors are acceptable in historic preservation projects.

1. Wood doors shall be prefinished.
2. Hollow core wood doors and plastic laminated are prohibited.
3. Specify compliance with AWS and WDMA "Premium Grade" quality standards for fabrication, reproduction, repaint, and installation of wood interior doors.
4. For wood repair, "Bondo" is prohibited.
5. Hollow Metal doors are required for mechanical rooms.
6. All metal doors shall be welded construction.

### 4.6.2 Hardware

Reference Appendix 3.2-2 Door Hardware

1. Kick and push / pull plates are required for doors in high use areas.
2. Protection plates are required for laboratory areas where movable carts commonly moved in and out of rooms.
3. Floor mounted stops are prohibited.



#### 4.7 Interior Borrowed Lights

Interior window glazing shall comply with IBC standards.

##### 4.7.1 Window Construction Types

1. Site constructed wood windows, hollow metal and aluminum storefront are acceptable methods and materials for interior borrowed lights.
2. Specify compliance with AWI and WDMA “Premium Grade” quality standards for the fabrication, reproduction, repair and installation of wood windows.
3. All interior borrowed lights shall have removable stops in the event that the glazing is damaged.

#### 4.8 Stairs

Stair design and construction shall comply with IBC standards.

##### 4.8.1 Stair Categories

1. Open, communicating stairs are to be designed as an integral part of the surrounding building area, with higher finishes used for treads and railings. Design of architectural feature stairs should be closely coordinated with local code officials in terms of open areas from floor to floor, placement of railings, etc.
2. Enclosed, code-required stairs may be concrete filled steel pan or precast concrete tread.
  - A. The quality of workmanship on stair rails shall not be reduced in fire stairs. The Design Consultant is to ensure the construction of stair rails in fire stairs is performed to the same quality as rails throughout the project.
  - B. Fire stairs shall have luminescent and/or color contrasting nosings per IBC.
3. Historic stair designs, regardless of category, shall be provided with permanent non-slip nosing.

#### 4.9 Caulking and Sealants

1. The Design Consultant shall specify joint caulking and sealants that establish and maintain watertight, airtight, and gap-tight continuous joint seals without staining or deteriorating joint substrates.
2. Elastomeric joint sealants shall be specified for exterior applications.
3. All joint caulking and sealants shall be specified as Low VOC.



Ceremonial Stairs  
have special design  
considerations





#### **4.9.1 Review Process**

The Design Consultant shall specify that the Contractor shall provide product data and samples to verify that the joint caulking and sealant to be used meets the requirements listed in the specifications, and that the selected color matches neighboring material colors.

Locations, sizes and materials of exterior sealant joints must be reviewed with Facilities Services and the Project Manager for weather integrity of the building envelope and maintainability for the life of the building.

#### **4.10 Hazardous Materials**

Whenever remodeling work is considered in existing campus buildings consideration must be given to identification and abatement of hazardous materials. Typical materials that may be found and that require abatement are asbestos, lead, and mercury, although other materials may need to be considered on a case by case basis. Typical materials routinely identified for abatement include asbestos containing materials such as floor tile and mastic, drywall and drywall mud, ceiling tile, fireproofing, ductwork, and various insulation materials. Also common are lead containing materials such as paint and ceramic tile glaze. This is not an exhaustive list, asbestos and lead are always being found in unexpected materials and locations. Identification and abatement costs are typically to be a part of the project budget.

##### **4.10.1 Process**

Early in the consideration of a remodeling project, especially in buildings constructed prior to 1978, the Design Consultant should examine any existing information the university may have on hazardous materials in the building. If no such information exists the Design Consultant should request that MSU conduct an examination of potential hazardous materials in the project area. In any case, existing information that MSU may have should not be considered complete. A thorough examination should be made by a qualified and licensed Industrial Hygienist and a report made including abatement procedures. MSU may choose to self-perform abatement of small areas. If not, the abatement plan should be included in the scope of work of the contractor performing work on the project. The scope of work of the Industrial Hygienist must include monitoring the work of the abatement contract, testing, sampling and providing a final clearance report. Depending on the type and scope of abatement an EPA permit may be required. All efforts outlined above are to be coordinated by the Project Manager.

##### **4.10.2 Special Considerations**

On projects involving laboratory spaces that have quantities of stored materials that may include dangerous chemicals or radioactive materials MSU Safety and Risk Management shall be informed and engaged as part of the initial examination and identification process.

**END OF SECTION 4.0**

Hazardous Materials  
Report Conduct  
hazardous materials  
investigation for  
every project in  
existing buildings



## 5.0 BUILDING SYSTEMS

### 5.1 Information Technology

MSU's Information Technology Center (MSU ITC) controls all data systems, wiring specifications and installation, and audio visual specification and installation on MSU campuses. Facilities Services and CPDC work closely with ITC on the design, specification and installation of information technology infrastructure and equipment on all remodeling, addition and construction projects at MSU.

#### 5.1.2 Design and Installation Requirements

ITC has a wiring and equipment specification for academic buildings, the latest version of which can be found at

<http://www.montana.edu/itcenter/guidelines/telecomm/>.

ITC has a wiring and equipment specification for audio/visual installations for classrooms, which is incorporated as a part of the MSU Classroom Design Guide (See Section 5.2).

ITC manages the installation of all technology infrastructure and equipment on campus, including work by the Contractor. Requirements for certifications, licensing, etc. must be included in the specifications.

A separate but affiliated information technology group at MSU, ResNet, provides all IT services in Auxiliaries buildings including student housing, food, service locations, the Student Union, Marga Hosaeus Fitness Center, and all athletic buildings including Brick Breedon Fieldhouse and the Stadium. ResNet has control over the design and installation of all information technology systems in these buildings.



### 5.1.3 Requirements for As-Built Drawings

Reference Section 1.8 Documentation and Archiving.

## 5.2 Audio and Visual Systems

Classroom technology is managed by the Instructional Technologies department within ITC. They are responsible for the design, installation and maintenance for the audio / visual technology for classrooms, lecture rooms and conference rooms in academic buildings on campus. A separate group exists within ResNet that has responsibility for Audio / Visual systems in Auxiliaries buildings.

Designers working on projects for which Audio / Visual systems will be included will need to work with ITC or ResNet through the Project Manager to determine all electrical and wiring requirements for equipment to be included in the project. ITC will provide detailed information on all AV systems that will be purchased and installed by ITC, including screen sizes, projector locations, system control technologies, etc.

Reference Appendix 6.2-1 Classroom Design Guidelines

Documentation and  
Archiving  
See Section 1.8

Classroom Design  
Guidelines  
See Appendix 6.2-1



5.3 Heating Ventilation and Air Conditioning

5.4 Power and Lighting

5.5 Plumbing

END OF SECTION 5.0

## 6.0 FUNCTIONAL USES

### 6.1 Laboratory Design

Laboratories are critical to MSU's mission in the 21st Century. The laboratory Design Consultant must be aware of the needs of the users, the ways the laboratory will and might be used, and the technical needs of the department involved and the technical requirements of the space itself. Critical to the success of the project will be the early involvement of the University Facilities Engineering and Ground & Building Maintenance Departments.

Establishing parameters for energy consumption and sizing of utility services and distribution is of paramount importance to the university. These parameters must be established early in the project, pre-schematic phase, applying established benchmarks, and projected usage with demand and diversity factors. The Project Manager will meet with the academic department / client, the Design Team and Facilities Engineering to establish these parameters which will be included in the Basis of Design.

The Design Consultant should keep in mind that laboratory design is a highly specialized field. Adequate research, programmatic development and due diligence are essential to their successful design and construction. Codes and guidelines referred to in this (or any other) section of the Standards Manual are not to be assumed as comprehensive. It is incumbent upon the Design Consultant to properly investigate the specific requirements of the lab to ensure compliance with all local, state and national codes and regulations.

#### 6.1.1 Guidelines for Laboratory Design

1. General Approach
  - A. Meeting the educational and research goals of the academic department and those for the project should be the guiding principle for the Design Consultant. Laboratory design should be reviewed with the Project Manager and the academic department / client to determine programmatic needs and parameters. Refer to the MSU Laboratory Design Guidelines (See Appendix 6.1-1).



Laboratory Design  
Guidelines  
See Appendix 6.1-1



Establish parameters for sizing and distribution of utilities services early in design

- B. There are different requirements for laboratories, teaching and research, depending on the educational approach to be used in the laboratory. Detail is extremely important to the success of laboratory space; it is incumbent upon the Design Consultant to ascertain the needs of the various laboratory types in a project, to thoroughly understand the requirements for the systems to be incorporated into the laboratories, and to detail the space around those needs and requirements. Based on these meetings a “Basis of Design” will be developed.
- C. Establishing parameters for energy consumption and sizing of utility services and distribution is of paramount importance to the university. These parameters must be established early in the project, pre-schematic, applying established benchmarks, projected usage with demand and diversity factors. The Project Manager will meet with the academic department / client, the Design Team and Facilities Engineering to establish these parameters which will be included in the Bases of Design.
- D. Flexibility of and reconfigurable cabinetry and utilities.
- E. All labs to provide for accessibility

## 2. Layout – General Requirements

- A. Laboratory space should be separate from offices and common space.
- B. Laboratories should be oriented such that a common service corridor can serve two laboratories (lab, service corridor, lab).
- C. Occupants should not have to go through a laboratory space to exit from non-laboratory areas.
- D. Fire-rated hallway doors should have magnetic hold-open devices.
- E. Mechanical and Electrical services and devices shall be readily accessible

## 3. Finishes

- A. Acoustic considerations should be primary concern in finishes for laboratories. Acoustic control between laboratories is also important, so that sound transmission classification (STC) ratings of structural components and finishes should be taken into account when selecting materials and systems.
- B. Walls and Doors – There is no “standard” wall material or finish, but the Design Consultant must remember that the facility needs to be finished in a way that allows for normal cleaning, upkeep and maintenance (See Section 4.3 Painting for additional information).
- C. Doors into laboratories should be provided with vision panels to allow students to see if room is in use.

#### 4. Floors

- A. Wet chemical laboratories should have chemically resistant covered flooring, particularly in areas where fume hoods are located. Finished flooring shall be installed throughout the laboratory to accommodate flexible laboratory conditions and room modifications.
- B. Preferably, floors shall be level with no floor drains to accommodate flexible laboratory conditions and room modifications. Floors in predominantly wet areas shall be non-slip and floor drains are preferred.

#### 5. Ceilings

- Concern for proper acoustics should prevail in selection of ceiling materials. If acoustic ceilings are to be used, the preference is for a removable tile system framed on a unistrut system.

#### 6. Window Treatment

- A. Review need for sunlight filtering in laboratories. Roll-down solar shades are standard. If additional light control is necessary room darkening shades may be used, and may be manual or motorized.
- B. Room Darkening vs. Solar Controls – Solar controls to support the HVAC needs must be considered for both the exterior and interior of the laboratory space.

#### 7. Furniture, Fixtures and Work Surfaces

- A. Should be chemical resistant, smooth, and readily cleanable.
- B. Benchwork areas should have knee space to allow room for chairs near fixed instruments, equipment or for procedures requiring prolonged operation.
- C. Handwashing sinks for particularly hazardous chemicals or biological agents may need elbow or electronic controls.
- D. Casework exteriors of high pressure plastic laminate or metal are preferred
- E. Casework in teaching laboratories shall conform with ADA requirements. Casework in non-teaching (research) laboratories shall be adapted to the requirements of the individual users.
- F. Limit the number of cup sinks in the laboratory (including in fume hoods) in order to avoid dry traps and the ensuing odors.







Safety Considerations  
-All planning for laboratory safety considerations, including chemical storage and handling, signage, and personal safety must be reviewed with MSU Safety and Risk Management (SRM)

## 8. Storage

- A. Cabinets for chemical storage should be of solid, sturdy construction and vented as required. Hardwood or metal shelving is preferred.
- B. Laboratories using compressed gases should have areas designated for cylinder storage and be equipped with devices to secure cylinders in place.
- C. Provide space for chemical waste collection containers other than in fume hoods and sinks.
- D. Provide space for storage of supplies and combustible materials, e.g., boxes of gloves, spill kits, boxes of centrifuge tubes, etc.

## 9. Eyewash and Safety Showers

- A. Laboratories using hazardous materials must have an eyewash and safety shower within 100 feet or ten seconds travel time from the chemical use areas.
- B. Eyewashes and safety showers should be standardized within a laboratory building.
- C. Flooring under safety showers should be slip-resistant.

## 10. Safety

- A. Utility shut-off controls should be located outside the laboratory.
- B. Environmental chambers where evacuation or other alarms cannot be heard should be equipped with strobe lighting or additional alarms.
- C. Include "Laser in Use" signs at all entrances to labs with lasers.

## 11. Security

- A. Review the need for security control of laboratories with the Project Manager. The university employs access control, as part of a campus-wide system, at all entrances of many of its buildings, and to some interior spaces as well.
- B. Laboratories classified by Safety & Risk Management as Security Protection Level 2 (high value equipment or security-sensitive materials) or higher may require additional security measures, such as card access, intrusion alarms, cameras, etc.

12. Laboratories having Bio Safety Levels (BSL 1-3)

- BSL laboratories have very specific design requirements and the services of a laboratory design specialist should be used for all such laboratories.

13. Laboratories using radioactive material

- A. MSU Safety and Risk Management (SRM) must be included during planning for any laboratories in which radio active material will be used.
- B. Eating and drinking areas must be physically separated and conveniently located.
- C. Allow for separate storage of radioactive materials.
- D. Consider designing the laboratory to allow separation of radioactive materials use from other laboratory spaces.

**6.1.2 Guidelines and Requirements for Documentation**

See Section 1.8 (Documentation & Archiving) for requirements for code review and permits, including the organization of construction drawings and documents for timely release of permits.

In addition to the documentation required for the permitting and construction of the project, the Design Consultant will (if specified in the contract for services) provide a Statement of Design Criteria during the schematic design phase and a written Basis of Design (B.O.D.) document during design development.

**6.2 Classroom Design**

Classrooms are the heart of MSU’s mission. The classroom Design Consultant must be aware of the needs of the particular users, the ways the classroom will and might be used, and the technical needs of the department involved and the technical requirements of the space itself.



Radioactive Materials  
-Any planning for laboratories with radioactive materials must include MSU

### 6.2.1 Procedural Guidelines

Early in the programming phase of the project, the Project Manager will review the proposed project with the University Registrar. The Classroom Committee, a subcommittee of UFPB, has the university-wide responsibility for classroom space on campus, and will provide oversight in the programming phase. The Project Manager, with the Design Consultant should meet with the University Registrar's office and the Classroom Committee to confirm the requirements for classroom space in preliminary programming.

The Project Manager remains the Design Consultant's primary contact and source of information, the Project Manager will involve other university sources in the project, including the University Architect, the project representative for the Facilities Services, and ITC personnel.

Meetings with the academic department / end user, Registrar, ITC and the University Architect will be arranged by the FPDC Project Manager.

### 6.2.2 Guidelines for Classroom Design

MSU has set forth a standard Classroom Design Guide, the Design Team shall become familiar with the requirements and design principles detailed in the Classroom Design Guide (See Appendix 6.2-1).

### 6.2.3 Guidelines and Requirements for Documentation

See Section 1.8 (Documentation and Archiving) for requirements for documentation.

In addition to the documentation required for the permitting and construction of the project, the Design Consultant will (if specified in the contract for services) provide bidding documents for fixed classroom furniture and for the Audio / Visual systems in the building.

These should be separate documents prepared with the furniture and Audio / Visual consultants and coordinated with the electrical contract documents (for conduit runs, junction and floor box selection and placement, lighting, power, etc.). See Sections 6.12 (Audio-Visual Standards) and 1.7 (Furnishings, Fixtures, and Equipment) for additional information.



Classroom Design  
Guidelines  
See Appendix 6.2-1

Documentation and  
Archiving  
See Section 1.8

Furnishings, Fixtures  
and Equipment  
See Section 1.11



## 6.3 Residential Hall Design

The Design Consultant should be aware that undergraduate residence halls are occupied by students nine months of the year, while graduate residence halls are occupied year-round. Undergraduate residence halls also provide housing for summer conferencing and sports camps, so access for survey and planning purposes must be coordinated with the Housing Office and Facilities Services during summer months and transition periods.

### 6.3.1 Review Guidelines – General

Initial planning and preliminary design will be conducted through the FPDC Project Manager and with the Housing Office. A Building Committee will be assembled that will act as the internal “client” for the project.

As the project moves toward the construction documentation and code review phases, it is required that the project construction documents be submitted to the university for an internal review process through the PFDC for compliance with university standards.

For residence hall renewal projects and new construction, planning begins at least two years in advance of construction.

After preliminary design is complete, additional departments may be brought into the Design Development and construction planning phases. Departments such as Facilities Services, University Food Services, and University Police may be included in the review process, and may act as in-house consultants for specific aspects of the project.

During the pre-construction phase mock-ups are constructed (and may include complete full-scale models of rooms) to aid the review committee in selecting room finishes and accessories, window types, light fixtures, heating units, piping enclosures, etc. a significant amount of effort is necessarily put into the design and documentation of mock-ups, for they are the tools that lead to final design decisions and to the aesthetic that ultimately forms the project.



### 6.3.2 Considerations for Residence Hall Design

#### 1. General Approach

- A. In new construction and in residence hall renewal projects, providing opportunities for interaction between students and facilitating the development of a feeling of collegial unity is encouraged. However, the mix of social spaces with living spaces, the density of bed spaces in living spaces, the inclusion of educational spaces in a dormitory, and the type and number of support / utility spaces in a dorm, along with other design considerations, is highly dependent upon the purpose the residence hall serves.
- B. Residence halls primarily serving freshmen have special design parameters. It has been shown that student success in the first year of college is greatly enhanced by the creation of friendships and a feeling of being part of an identifiable group. The freshman residence hall design should support this need for socialization as part of the living environment in addition to the need for students to have a structured study environment as part of their living area. The larger residence hall environment should also be capable of encompassing group activities organized by the Residence Life organization designed to encourage a sense of community. Each freshman residence hall will typically contain a full complement of service and support spaces such as laundry, kitchen and lounge.
- C. In upper-class residence halls the individual's living space is typically larger (in terms of square feet per occupant) than in the freshman residence halls, and providing a variety of living arrangements is a desirable goal. Single-occupancy rooms are popular, with two-room doubles and three-room quads sought after as well. Students are typically self-directed in their studies at this point and, for some, privacy for work is an overriding concern. Along with providing a wide choice of living arrangements, each upper-class residence hall will typically contain a full complement of service and support spaces such as laundry, kitchen and lounge.
- D. The initial step in a residence hall renewal project is to determine a preliminary scope of work and to conduct a full-scale survey of the building. This survey should be performed after discussions with the Project Manager, the Residence Life maintenance manager, and Facilities Services Grounds and Building Maintenance Department, to assemble available information on systems in the building, and to gain insight on any known defects in a building. In interviews prior to surveying a building, the Design Consultant can be advised of any environmental issues that might affect the project. A report on existing conditions is produced from the survey, including information on the building finishes, envelope and systems. The report will be presented to the review committee, which may make suggestions for revisions or modifications before a final version of the report is produced.



Conduct full-scale survey prior to design of residence halls





- E. The report is used as a tool to develop the building program and to guide the professional in the schematic design process. Input from the design review committee is critical at this point in the process. The committee will prescribe the desired bed count, the mix of singles, doubles, and quads, the bathroom fixture ratio, etc. additional survey work may be needed to measure critical areas after initial planning and design is completed. Some core samples of building systems may be required to ascertain existing construction, and investigative demolition might be carried out in this effort.
- F. After schematic plans are approved by the review committee, the Design Consultant is to provide a furniture layout plan, which will be used to develop the design of electrical and mechanical systems in the residence hall rooms. This step is important in developing plans for new construction as well as in dormitory renewal.
- G. As electrical and mechanical systems are developed for the building (with the chases, duct shafts, etc. that these systems require), the Design Consultant will need to coordinate the mechanical systems with the furniture layout. The intent is to produce a plan that integrates building systems into the overall layout, without sacrificing utility and comfort to aesthetics, or vice versa. The Building Committee will be presented with the final building layout and furniture plan for approval before the project is carried into the Construction Documentation Phase.
- H. Room Numbering Requirements See Appendix 1.8-3 for room / space numbering system guidelines.

2. Exterior

A. Accessibility

- i. Some of MSU's residence halls were originally designed in ways that make it nearly impossible to provide a barrier-free access to all parts of a building. Nevertheless, one of the goals of the residence hall renewal projects is to create accessible routes to as many dormitory spaces as is reasonably possible, and to create accessible social and support spaces (See Section 1.9 Accessibility).
- ii. The project review committee will advise the Design Consultant on the level of accessibility desired in the project, based on options presented by the Design Consultant and influenced by campus-wide accessibility needs.
- iii. Code minimums, including both ADAAG and FHA requirements, must be met for accessible and adaptable units within a residence hall area.

B. Safety and Security

- Consideration for both vehicular and foot traffic is to be given to the routes into and along buildings, so that cul-de-sacs and dead-ends are eliminated. (The same considerations should apply to interior circulation.) See Section 1.12 for more information.



Door and Room  
Number Standards  
See Appendix 1.8-3

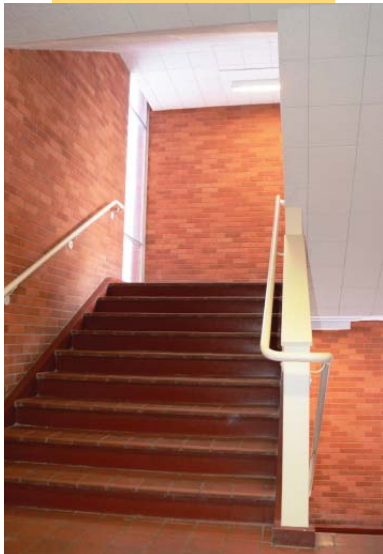
Accessibility  
See Section 1.9

Security  
See Section 1.12

Access Control  
Systems  
See Section 3.1

Exterior Finishes  
See Section 3.6





C. Exterior Materials and Finishes

- i. Similarly to other campus buildings, exterior materials and finishes should be selected, specified and detailed for longevity, with an understanding that the university has a difficult time keeping up with exterior envelope maintenance. Exterior finishes should have a minimum 35 year life and maintenance items such as sealant joints should be kept to a minimum.
- ii. All exterior materials and finishes must be selected and detailed to meet the extreme weather conditions encountered in Bozeman. Special attention needs to be paid to south and west exposures which have abnormally high temperature fluctuations and freeze / thaw cycles.

D. Site Accessories

- See Site Section 2.0 for more information and requirements for site accessories. Note that Auxiliaries Services may not always choose to use campus standard site furnishings and accessories.

3. Interior Circulation

- Interior circulation must provide reasonable access to all areas of the dorm and must, at a minimum, meet the requirements of the current building and life-safety codes in effect.

4. Finishes: specify durable wall and floor finishes; research requirements for fire ratings in corridors, provide listed assemblies where needed. At a minimum, use reinforced gypsum board for walls. (Standard gypsum board wall with taped finishes are not to be used in residence halls). Hallways receive hard use during annual move-in and move-out of student residents. Where carpet is used, carpet tiles are preferred. Finished in place wood flooring should be avoided. Flooring at building entries should be carefully considered to minimize the carrying of snow and slush into the building. Hard surface floor materials must meet or, preferably, exceed, code requirements for slip resistance. Acoustic absorption must be a consideration in corridors serving student rooms.
5. Lighting: lighting can have a dramatic impact on the character of interior corridors. If at all possible corridors should have daylight. Differing types / sources of artificial light should be used to modulate the visual experience of long corridors.
6. Stairwells: stairwells should be considered in two categories, Public / Decorative Stairs and Secondary / Fire Stairs. In the buildings up to four stories it should be assumed and encouraged that the stairs will be a primary means of vertical circulation and the possibility of stairways acting as areas of social interaction should be considered. Public / Decorative Stairs should have finishes that are an extension of the public spaces surrounding them.

7. Elevators: elevators in residence halls must typically function primarily as passenger elevators but must be used for moving of student belongings into and out of rooms as well. Elevator cabs, therefore, should be designed larger than the minimum cab size. Car speed should be considered with respect to high usage during peak times, especially morning hours when students leave for breakfast and/or class in large numbers during short periods of time. Cab finishes must be durable yet decorative. Resistance to vandalism is a major concern. Mounting for, and provision of, moving blankets should be included (See Section 4.2 for more information).
8. Social Spaces and “Public” Common Rooms
  - A. The mix of social space in a residence hall often depends on whether it is intended as a freshman residence hall or if it is an upper-class residence hall, whether some similar spaces are provided nearby, etc., and should be determined in the preliminary design phase in consultation with the review committee for the residence hall. Some examples of typical common spaces are:
    - i. Lounges
    - ii. Kitchens and kitchenettes
    - iii. Laundries
    - iv. Living, study and common rooms
    - v. Game and rec rooms
  - B. Considerations for public spaces and common spaces include:
    - i. Finishes: specify durable wall and floor finishes, with consideration given to softer materials in areas such as living rooms and lounges. Acoustic absorption must be considered in areas that may tend to act as gathering points.
    - ii. Utilities: See Section 5.0 Building Systems
    - iii. Common rooms should have daylight and should have operable windows. Windows should typically have high enough sill that furniture can be placed against the window wall.
    - iv. Furnishings: common spaces should have furnishings that complement the function of the space. Typically, there should be a mix of furniture types and groupings. The choice is a programmatic decision, and should be made in consultation with the project design review committee (See Section 1.11 for more information).
      - i. Lighting: lighting fixtures and sources for common spaces should be designed to enhance the programmatic function of the space. Lighting should also fulfill a decorative function in these spaces.
9. Sleeping Rooms
  - A. Finishes: the same considerations listed for common rooms apply to individual sleeping rooms.



Furnishings, Fixtures  
and Equipment  
See Section 1.11





- B. Doors and hardware: corridor doors will typically be fire-rated doors and should be equipped with hold-open hardware wired to the fire alarm system. Unrated doors with passage or privacy hardware may typically be used for doors interior to living units. Sleeping room doors in suites are equipped with privacy locks, as are bathrooms within units. Acoustic separation: considerable design effort should be given to acoustic separation of sleeping rooms, both room to room and floor to floor. Minimum rating of separation walls and floor / ceiling construction is STC 50, with 55 preferred. Additional care should be taken to prevent impact noise transmission in floor / ceiling assemblies.
  - C. Windows: all sleeping rooms must have operable windows, awning windows or casement windows are preferred. The same considerations for common rooms apply to sleeping rooms. Sill height at windows should allow for placement of furniture against the wall with windows.
  - D. Smoke detection: locate heads away from possible sources of interference or damage such as doors, wardrobes, ceiling-mounted bike hangers, bunk beds, light fixtures, etc. detectors shall have 36 inches minimum separation from air supply outlets.
  - E. Fire suppression: concealed heads are preferred, either ceiling-mounted or sidewall type. If a dry standpipe is adjacent to a room, access doors for inspection of the standpipe might be required within the room.
  - F. Furnishings: as listed above, the standard set of furniture for each occupant is a desk chair, a desk, a bed, and a dresser. Also a wardrobe and bookcase where not built in. the choice is a programmatic decision, and should be made in consultation with the project design review committee. (See Section 1.11 for more information).
10. Technology
- A. Along with all other areas of campus, technology must be integrated completely with the residential environment.
  - B. All residence hall rooms as well as all common areas must be served by wireless internet access.
  - C. Provisions should be made for group study areas that will also accommodate preparation for group presentations with appropriate technology such as flat screens with connections for laptop computers.
  - D. Technology must be planned for lounges where group activities such as watching movies or video gaming will take place.
  - E. If classrooms or conference rooms are incorporated into the dormitory, they should be designed to meet the requirements of the Classroom Design Guide.

### 6.3.3 Custodial Closets

Each residence hall will require, at minimum, a custodial storage room of approximately 100 square feet (and possibly larger in larger buildings) for paper products and cleaning supplies and equipment. Exact custodial requirements for each building are a program issue to be resolved during Design Development (Refer to Section 6.6 Custodial Closets and Storage for more information).

### 6.3.4 Recycling and Sustainable Design

Residence halls are learning environments with respect to sustainable design. Sustainable design principles should be a primary consideration from early in the design process. Sustainable design elements of the building should be celebrated in the design and may also have education components such as signage or “energy dashboards”.

Recycling is a key part of sustainable design in residence halls. Recycling facilities should be planned into room corridors and a central recycling area or dumpster should be planned for each building.

### 6.3.5 Signage Requirements

Prior to submitting signage design package the Design Consultant shall meet with the Project Manager to determine required locations and signage types (Refer to Section 1.10 Environmental Graphics for more information). Typical signage required in residence halls:

1. Emergency rooms evacuation signage
2. Room identification signage
3. Stair egress
4. Common area signage
5. Elevator
6. Electrical signage
7. Fire protection

### 6.3.6 Environmental Issues

Prior to undertaking renovation work in an existing residence hall, the university will arrange for a survey of the building to determine the possible presence of hazardous materials. The university will engage a separate consultant for any remedial consultation deemed prudent as the result of this survey, and will attempt to abate any hazardous material prior to the start of construction, using a separate contractor qualified to perform the abatement work.

Sustainable Building  
Principles  
See Section 1.6

Trash and Recycling  
Areas  
See Section 2.7

Environmental  
Graphics  
See Section 1.10

Hazardous Materials  
See Section 4.10

Documentation and  
Archiving  
See Section 1.8

## 6.4 Family and Graduate Housing Design

MSU Family and Graduate Housing (FGH) is part of MSU Auxiliaries Services and is under the direction of the Director of Auxiliaries Services, the Chief Housing Officer, and the Assistant Director for Family and Graduate Housing (AD for FGH). FGH provides apartment style housing to student families, graduate students, and staff of the university. Current FGH housing complexes are McIntosh Court, Brannegan Court, Grant Chamberlin, Julia Martin West, Julia Martin East, Koch and Story Towers, Paisley Court, and the Westside Houses.

### 6.4.1 Design Requirements

1. There is no single standard for the design of Family and Graduate Housing units or complexes, but the following should be considered in the design of any new housing:
2. FGH is, by definition, apartment style housing with full kitchen facilities in each unit and separate bedroom(s), bathroom(s), and living space within each unit.
3. A mix of unit sizes needs to be provided, ranging from one to three bedrooms. The mix of units should be decided upon in consultation with the AD for FGH and the Design Review Committee.
4. Laundry facilities must be provided, either within each unit or dispersed within a complex of units. If laundry is not provided in each unit adequate washers and dryers should be available within a reasonable distance to each unit. Number of washers and dryers per living unit for dispersed laundry centers will be provided by the AD of FGH.
5. Accessible living units, meeting the requirements of ADAAG and FHA, must be provided interspersed throughout the complex. The number of accessible units as a percentage of all units should be arrived at in consultation with the AD for FGH and the Design Review Committee.
6. Ideally, each living unit should be provided with its own heating / cooling equipment. At minimum, each living unit must have individual thermostatic control.
7. Materials and detailing for FGH apartments must be chosen with an understanding that these units will receive hard use and must function with a relatively low level of maintenance. Built-in cabinets should have plywood boxes not particleboard. Counter tops should ideally be solid nosing. Hard surface flooring should be provided in entries, kitchens and bathrooms, with carpet at living space and bedrooms. Closet doors should be either swing doors or sliding doors, not bi-fold type.



-FGH is apartment style housing

-A mix of unit sizes

-Must meet ADAAG and FHA guidelines for accessibility

-Choose materials for longevity and maintainability

Exterior Materials  
See Section 3



8. Similarly to other campus buildings, exterior materials and finishes should be selected, specified and detailed for longevity, with an understanding that the university has a difficult time keeping up with exterior envelope maintenance. Exterior finishes should have a minimum 25 year life and maintenance items such as sealant joints should be kept to a minimum.
9. All exterior materials and finishes must be selected and detailed to meet the extreme weather conditions encountered in Bozeman. Special attention needs to be paid to South and West exposures which have abnormally high temperature fluctuations and freeze / thaw cycles except for high rise housing, an FGH complex should provide both private and public open space associated with each living unit. Space / storage for outdoor toys and bicycles should be planned.
10. Additional storage space should be provided in the complex, dedicated to each living unit.
11. Parking must be provided for both residents and guests. Resident parking should be configured so that designated parking for each living unit is provided within reasonable proximity to the unit. Additionally, designated visitor parking should be provided within a reasonable distance to all units.
12. By definition, FGH is housing that must accommodate a variety of users, including families with children. In housing designed for family areas for play areas for children should be designed both within sight of each unit and in larger communal play areas for larger complexes as well. Streets, sidewalks and play areas should be designed to provide a safe environment for all users, especially children.
13. Landscaping is an integral part of the design of successful Family and Graduate Housing. Successful landscaping will provide areas of color and of shade, with the goal of fostering a sense of community. In larger complexes consideration should be given for communal gardens.



Safe environment for all users, especially children

Landscaping and Planting  
See Section 2.2

Interior Signage Standard  
See Section 1.10  
See Appendix 1.10-2

## 6.5 Corridors

Corridors and hallways are important building elements, providing not only the means of travel throughout campus buildings but serving as the visual introduction to most campus buildings as well. Durable and maintainable materials are critical to the good design of corridors, but equally as important are the issues of noise transmission and lighting design.

In academic buildings it is important in the design of corridors to accommodate large numbers of students waiting for and exiting the classrooms. Corridors in academic buildings should also be designed to encourage interaction of students and to allow for groups of students and instructors to continue classroom discussions after a class has ended.



Academic building corridors should encourage interaction

Appearance over time and maintainability are key features of finishes



Corridors in faculty office areas should be designed to accommodate students waiting to meet with faculty members and should provide a quiet zone so as to allow faculty members to work without distraction.

Corridors in research buildings should provide “collision spaces” where researchers and graduate students can gather to discuss their work outside of the constraints of the laboratories.

### 6.5.1 Construction and Fire Rating

Building use and occupancy load on corridors affect the fire rating requirements for a corridor or hallway. The current version of the IBC must be reviewed for these requirements. Note that the installation of a fire suppression system in a building may reduce the requirements for fire rating of exit components.

### 6.5.2 Finishes

Maintainability and appearance over time are key concerns. Finishes are project specific and should be determined within the context of the building design, and with the consensus of the project team and the university’s review committee. Consideration should be given to the application of sustainable wall, floor, ceiling, and trim finishes.

Preferences for finishes from a maintenance and housekeeping perspective are:

1. Walls
  - A. Masonry: brick, ground-face or painted block, glazed block, ceramic or stone tile
  - B. Frame: abuse-resistant gypsum board decorated with a level 5 finish in corridors and common spaces, with areas of wood or other decorative panels as accents. The Design Consultant should attempt to incorporate breaks, reveals, or other architectural details to divide large expanses of painted surface, particularly in the vertical direction. This is especially true in high traffic areas, areas using high pigment paints, or locations that are especially subject to abuse.
2. Floors
  - Masonry: concrete, terrazzo, stone, quarry or ceramic tile (all properly sealed to resist staining); vinyl composition tile, rubber tile; carpet (in a color and pattern that can hide wear. Entrance mats: specify polypropylene carpet-type walk-off mats with flexible vinyl backing unless built-in recessed mats are designed.

### 3. Ceilings

- A. Exposed: masonry, steel, or wood (meeting code requirements); suspended lay-in acoustic tile (in non-dormitory use)
- B. Framed: gypsum board, with all required access panels indicated on reflected ceiling plans and MEP plans where minimal systems exist; all public-area access panels below 9'-0" A.F.F. are to have Best cylindrical locks (refer to Section 4.1).

### 4. Trim

- There should be some form of base in corridors for housekeeping purposes, compatible with floor finish - tile, stone, wood, rubber. Review with Project Manager. Rubber base is preferred over vinyl base where appropriate.

## 6.5.3 Utilities

1. All utility piping and conduits should be concealed within finishes. Points requiring access should be 'centralized' as much as possible (including group valves, junction boxes, etc.) to minimize the need for multiple access doors or panels. The Design Consultant shall produce typical corridor cross-section drawings to illustrate all typically required coordination of piping, duct, conduit runs, and installation of devices. Maximize ceiling heights while providing for utility runs.
2. Power Outlets - Maximum 25 feet between outlets in corridors; provide outlets in stairs at each floor level. 20 amp dedicated circuit per corridor.
3. Lighting - Recessed in ceiling or wall-mounted sconces; standardize lamp types (26 Watt quad fluorescent, e.g., w/ common base configuration) to minimize need for storing multiple replacement types. Coordinate normal ambient lighting with emergency lighting; use campus emergency power network where available for emergency lighting. A list of replacement lamps is to be included in the closeout documentation required of the contractor.
4. Ventilation - Determine requirements and need for heating and ventilation in corridors early in project; review with Project Manager. Plan duct runs for ventilation and make-up air and coordinate with ceiling installation and other utilities. Consider impact of duct distribution on structural frame depth in corridor. Make-up air is generally required to be tempered.
5. Fire Alarm - Provide required smoke detection, pull stations and alarm signaling devices. Maintain required clearance between smoke detectors and HVAC supply diffusers. Coordinate device placement with other corridor systems and with architectural finishes by preparing elevation drawings showing pull stations, horn/strobes, hold-open devices, exit fixtures, etc. with other required devices, systems, and elements.



Preference for  
concealed utilities  
Power, Lighting,  
Ventilation, and  
Sprinklers  
See Section  
5.3, 5.4, 5.5

6. Sprinklers - Concealed pendant heads preferred; concealed sidewall heads are an option in new construction and major renovation, exposed piping and exposed sidewall heads are not acceptable.
7. Extinguishers - Coordinate location of hand-held fire extinguishers. Provide recessed cabinets for storage of extinguishers. Review proposed locations with Project Manager, and with local fire official as directed.
8. AED – AED's are to be included in all new construction and major remodeling. Number and location of AED's is to be coordinated through the Project Manager.

#### 6.5.4 Doors and Hardware

Stair openings typically require rated assemblies (frame, door and hardware); doors must meet temperature-rise requirements. Provide detector-activated wall or floor hold-opens on stair doors and smoke doors to eliminate use of wedges and chocks. Coordinate hold-open devices with fire alarm system design. Review the need for rated assemblies in corridors in buildings with fire-suppression systems (See Section 4.5 Interior Doors) for requirements for hardware in corridors.

#### 6.5.5 Miscellaneous

The Design Consultant should be aware of security and safety concerns: limits on dead-end corridors in codes; control of access to remote areas; provision of emergency phones in appropriate areas. Review the need for signage and accessories such as message boards in corridors. Drinking fountains are required by code, and water chillers are desirable; consider the possible inclusion of hot-water dispensers with water chillers.

#### 6.6 Standards for Custodial Closets and Storage – Building Services Grounds and Building Maintenance

The need for space for custodial purposes must be addressed in the programming phase of design in a building project. It is important that early design review of custodial closets in storage rooms occur with the Environmental Service Manager. Each building will require a custodial storage room (See Appendix 6.6-1). Ideally, custodial storage rooms should have a door width of 40-inches or greater to allow for passage of larger cleaning machines. These closets are not to be programmed with building mechanical and electrical spaces. Exact janitorial requirements for each building are a program issue to be resolved during design development.



Example of AED  
Automated External  
Defibrillator

Buildings up to 10,000 square feet will require at least one custodial closet of approximately 35 square feet, and one of equal size on each additional floor level of the building.

Buildings up to 50,000 square feet will require two to three custodial closets, a minimum of one per floor level.

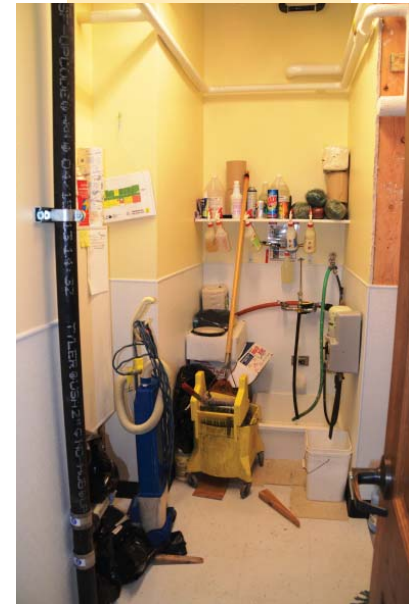
Buildings up to 100,000 square feet will need three to four custodial closets minimum, at least one per floor level; larger buildings should be programmed for additional closets at the rate of one per 25,000 square feet.

### 6.6.1 Design

Construction and Fire Rating:

Review need for fire-rated enclosure and door assembly, including door closer finishes.

1. Walls
  - Masonry: brick, block, glazed block, ceramic tile frame with level 4 GWB finish, gloss painted finish. A stainless steel backsplash shall be above floor receptor.
2. Floor
  - Concrete (properly sealed), terrazzo, ceramic or quarry tile coved base to match floor. No floor drain is required.
3. Ceiling
  - Exposed structure is preferred. If rated ceiling is required, plaster finish should be specified.
4. Utilities and Equipment
  - A. Receptors
    - Floor receptor with raised rim is preferred, 36-inch square, with 24-inch high stainless steel backsplash wall-mounted sink only; if receptor cannot be used faucet with hose connection, short length of hose; provide water-tight connections at receptor.
  - B. Power
    - GFI receptacle on wall away from water supply.
  - C. Lighting
    - 4 foot utility fluorescent with guard at ceiling, wall switch.



5. Ventilation
  - Exhaust ventilation with make-up air; review requirements for tempering make-up air.
6. Piping
  - Maintain headroom of 90-inches, piping, conduit, ductwork, etc. to be installed above that level.
7. Detectors
  - Smoke detection may be required; review use.
8. Sprinklers
  - Provide upright pendant with wire cage in buildings with suppression.
9. Shared dormitories not within the vicinity of a custodial closet provide hose bibs with hot and cold water under lavatory. Use hose bibs with key stops.
  - Accessories – in one closet per building (typically), install cleaning chemical dispenser over receptor friction-type mounting brackets for mops, brooms, etc. on wall over receptor (not under chemical dispenser) 12-14 inches stainless steel shelving high on third wall, 8 feet total if possible.

#### **6.6.2 Custodial Supply Area**

1. Construction and Fire Rating (same concerns as with custodial closets)
2. Install durable finishes, painted walls and ceiling.
3. Provide metal shelving, 16-inch deep minimum, 48 foot length (+/-), provide a minimum of 22-inch clear between shelving; maintain required clearance for sprinklers.
4. Meet minimum requirements for heating and ventilation.

#### **6.7 Electrical Rooms**

See Section 5.4 Power and Lighting

#### **6.8 Mechanical Rooms**

See Section 5.3 Heating Ventilation and Air Conditioning.

#### **6.9 Restroom Design Criteria**

##### **6.9.1 General Design Criteria**

Restroom requirements vary widely depending on the type and function of the building in which they exist. There are, however, common guidelines and requirements for restrooms across building types that shall be followed:

1. Restroom locations shall be easily located and visible.
2. Locate on the same floor as the population being served, with visibility to prevent crime and vandalism.
3. All Restrooms in new and remodeling projects are to fully comply with current IBC and ADAAG guidelines.
4. Locate where accessible and convenient to entire building population and visitors, able and disabled.
5. Locate within 75 feet from any workstation or area.
6. Minimum requirements are per the student and staff section of the current International Association of Plumbing and Mechanical Officials (IAPMO) guidelines, applicable current codes and Authority Having Jurisdiction (AHJ).
7. Design for overall campus occupancy ratio of 60 percent women to 40 percent men.
8. Consult Plumbing section of these guidelines for pipe sizing and for selection criteria for plumbing fixtures and faucets.
9. Provide wall-hung toilets and urinals as applicable.
10. Finishes shall be hard, durable, smooth, water resistant, and easily cleanable. Provide wainscot at five feet AFF minimum. Tile grout shall be tinted, not white. Counters with sinks should never be plastic laminate.
11. Restroom design elements and finishes in remodeling projects should reflect the design and materials in the building in which the remodeling takes place. This is especially important in historic buildings.
12. Provide depressed slab(s) sloped to drain(s) at one-eighth inch per one foot minimum in restrooms at all new construction.
13. Consider use of durable materials high recycled content.
14. Consult section of these guidelines that refers to selection of restroom accessories. Note that standards for accessories may vary between Academic and Auxiliaries buildings.
15. In restrooms that include showers, the following should be considered:
  - A. In residence halls each shower in shared shower rooms should have a separate space for changing and should have adequate places to set toiletry kits during showering and hooks for clothing
  - B. If possible, each shower should have its own drain.
  - C. ADA shower stalls can be either roll-in type or transfer type.
  - D. The preferred material for shower walls is one-quarter inch solid surface panels in as large panel sizes as possible.
16. Convert existing single-occupancy or single-stall restrooms in all MSU owned buildings from gender-specific to all gender facilities with privacy and security as noted in the guidelines. It is anticipated that conversion will usually be limited to revised signage.

ADA Requirements  
See Appendix 1.9-3



### **6.9.2 Gender Specific/Multi-Stall Restroom Design Criteria**

Construction, renovation, alteration and replacement of restroom facilities are subject to federal, state and local building codes. In general, the occupancy load of university buildings shall dictate the requirement for multi-stall restrooms. If/when gender-specific/multi-stall restrooms are provided, the guidelines and requirements across building types at MSU that should be followed include:

1. Separate by gender when more than 10 employees are to be served.
2. Design for ratio of women's toilets to men's toilets and urinals of no less than three women's to two men's restrooms.
3. Men's restrooms shall have a minimum of one urinal, one toilet and one lavatory; women's restrooms shall have a minimum two toilets and one lavatory
4. Provide floor mounted, ceiling supported, partitions with textured, anti-graffiti or graffiti resistant surfaces. Partitions should be solid phenolic resin type. Provide a coat hook on stall door interior. Provide dividers at urinals as well.

### **6.9.3 Gender-Neutral Restroom Design Criteria**

Montana State University is committed to creating and sustaining a campus environment that supports and values all members of our community. MSU seeks to promote a friendly environment in which to live, work, and study. One aspect of creating an inclusive environment is the availability of safe, accessible, and convenient restroom facilities. Campus constituents may experience difficulty, inconvenience, or harassment when using gender specific restroom and facilities. Gender neutral facilities are necessary from the perspective of universal design and for people who may need personal assistance services, individuals that may face discomfort or discrimination in gender specific facilities, and families with small children.

As such, a minimum of one gender neutral restroom shall be included for all major renovations, additions, and for new construction as is reasonably feasible. These guidelines focus on providing a safe environment, consistent with MSU principles of community. Restroom design criteria and requirements vary widely depending on the type and function of the building in which they exist. The guidelines and requirements for gender neutral restrooms across building types at MSU that should be followed include:

1. In general, for small and medium renovations, requirements for gender neutral restrooms shall not be required. For major renovations or where major restroom renovations are part of the scope, inclusion of one gender neutral restroom if not already existing, should be included.
2. Where applicable, gender neutral restroom shall include a diaper changing table in addition to standard restroom fixtures/equipment.
3. Door hardware shall have a privacy latch. Ideally when the latch is in the locked position, the exterior hardware displays the word "occupied."

4. Restroom signage shall meet all federal, state, local and ADA signage requirements. Typically all gender restrooms will be signed as "RESTROOM" and include the ADA pictogram when those requirements are met.
5. Residential Facilities - Because of the variety of facilities that Residence Life deals with, the Consultant shall discuss with the User specific project requirements and criteria.
  - a. However it is expected that at least one gender neutral restroom be provided as part of major renovations or new construction.
6. In restrooms that include showers, the following should be considered:
  - a. Each shower in shower rooms should have a separate space for changing and should have adequate places to set toiletry kits during showering and hooks for clothing.
  - b. ADA shower stalls can be either roll-in type or transfer type.
  - c. The preferred material for shower walls is one-quarter inch solid surface panels in as large panel sizes as possible.

#### **6.9.4 Changing Rooms**

For new buildings, construct at least one gender inclusive changing room in each location in the building where locker rooms or changing rooms are provided. For major renovations, construct at least one gender inclusive private changing room in each location in any building where locker rooms or changing rooms are provided or when the locker room or changing room is renovated.

#### **6.9.5 Showers**

Construct gender inclusive showers in new buildings in which showers are provided. If the shower or showers are located within a locker room/changing room facility, the gender inclusive shower(s) shall be located so that the user need not leave the area to use the shower. Construct at least one gender inclusive shower in each location in any building where showers are provided when a major renovation occurs or when the existing showers are renovated. Locate shower within the locker room/changing room facility so that the user need not leave the area to use the shower.

#### **6.9.6 Family Care Rooms**

See 6.17 for Family Care Room Design Criteria.

## 6.11 Conference Rooms

This document provides design and construction criteria for conference rooms, meeting rooms and videoconference rooms.

### 6.11.1 Programming Phase

During the programming phase the purpose and use of the conference room must be determined, including:

1. Number of people the room needs to accommodate
2. Requirements regarding flexibility of use and programs to be served
3. Level of technology to be included for presentations, teaching and video conferencing



### 6.11.2 General Design Criteria

1. The room should be located away from noise-generating activities taking place either outside or within the building. The rooms shall be located away from loud machinery, vending machines, offices, labs, and traffic areas.
2. Ample space shall be provided in the room design for the programmed seating configuration, presentation space and support space such as furniture and equipment storage.
3. Adequate ceiling height shall be provided to allow an unobstructed view of properly sized information displays. Sight lines must be verified.
4. The front wall of the room behind the presenter / instructor area should have no protrusions (structural or otherwise) into the room so that chalkboard, marker boards, projection screens, or information displays can be installed across the entire wall of the presenter area.
5. The overall noise criterion of less than 30 is required. The maximum sound level shall not exceed 35dBA. A NC-25 is the goal for all presentation spaces.

### 6.11.3 Room Shape and Configuration

In general, MSU prefers flexibility in room orientation so end-users are able to rearrange furniture components to meet specific event requirements.

Rectangular shaped rooms are appropriate for many types of instructor-led presentations.

The following guidelines apply:

1. The length of the room should not exceed its width by more than 50 percent.
2. The presentation area and information displays should generally be located on the narrow wall of the room.
3. Rooms that are wider than they are deep usually present unacceptable viewing angles for information displays and for information written on the marker board.
4. Wide room configurations may be appropriate to support seminar or group interaction among audience participants. This is relevant when curved or semi-circular rows are set up to encourage communications and easy eye-contact between participants.



Carpentry and Frame  
Wall Finishes  
See Section 4.4

#### 6.11.4 Room Surfaces and Finishes

1. In non-videoconference rooms the front wall (i.e. the wall at the presentation end of the room), should be hard surfaced (e.g., sheetrock, masonry or wood) with no special acoustical shaping or treatment.
2. In non-videoconference rooms the front three-quarters of each sidewall should be constructed of hard (acoustically-non absorbent) materials (e.g. sheetrock, masonry or wood). These walls should not employ fabric covering or any other acoustically absorbent finish.
3. In non-videoconference rooms install acoustically absorbent finish on the rear one-fourth of the sidewalls and the entire rear wall. The sound absorbent material should have an NRC rating of 0.60.
  - In non-videoconference rooms painted surfaces should be light in color and should be a durable finish.
4. In videoconference rooms all of the walls should be covered with acoustically absorbent materials with a NRC rating of 0.85.
  - A. Ceilings should be a light color.
  - B. In general, acceptable videoconference finishes have a maximum reflectance of 60 percent, no patterns or textures that will cause the video camera to produce a moiré in the picture and be tan, blue or teal in color.
  - C. In general, black or white surfaces should be avoided.
  - D. The floors shall be carpeted with an anti-static, high traffic, commercial grade carpeting.
  - E. Marker boards used in videoconference capable conference rooms and classrooms shall have a finish designed for use in videoconference facilities. Most marker board manufacturers offer a video-friendly finish.
  - F. The reflectance values of paints, vinyl coverings, laminates, and other finish materials should be selected to enhance ambient illumination and the illumination at work surfaces. The following values are recommended:
    - i. Ceilings 70 percent to 90 percent
    - ii. Walls 40 percent to 60 percent
    - iii. Floors 30 percent to 50 percent
    - iv. Desktops 35 percent to 50 percent
    - v. Marker boards 20 percent to 30 percent

### 6.11.5 Wall Construction

1. Walls shall be mechanically isolated from the building structure and shall be isolated at the top and bottom with a Neoprene seal or equivalent.
2. Walls shall go from slab to slab in order to reduce noise paths into the room.
3. In videoconference rooms double offset wall studs, sound channels or other wall construction should be used that will minimize the transfer of noise from surrounding spaces.

### 6.11.6 Windows

1. Large window areas provide light control and exterior noise problems and should be avoided.
2. All window treatments shall be opaque and capable of preventing outside light from reaching the information displays.
3. In large rooms a motorized window shading system that can be integrated with external audio-visual control systems is preferred.

### 6.11.7 Doors

1. Doors shall be located in the back of the room away from the presentation area in order to minimize disruption. In rooms that require two egress points, the doors should be located as far from the presentation area as possible.
2. Doors shall be sound-rated or at a minimum solid core to prevent noise from entering the room.
3. At video conference rooms, doors shall be equipped with acoustically rated compressive seals.
4. All doors shall be a minimum of three feet wide and shall be equipped with a vision. The area of the glass shall not exceed 100 square inches and shall be double-paned.
5. Because ventilation louvers permit sound transmission, doors shall not contain louvers.

Windows  
See Section 3.3

Interior Doors  
See Section 4.6



### 6.11.8 Ceilings

1. A minimum nine-foot ceiling height shall be utilized for rooms that are 24 feet or less in length. In rooms where the programmed seating requirements, presentations space and support space require a room deeper than 24 feet then ceiling height needs to be greater.
  - A. The length of the room determines the maximum usable size of the projection screens.
  - B. In a room with a flat floor the bottom of the projection area of the screen must be at least four feet above the finished floor.
2. A minimum of approximately half of the ceiling area should be acoustically absorbent.
3. Access hatches must be installed in the ceiling wherever gypsum board or plaster is used to facilitate access to otherwise inaccessible areas of the ceiling cavity.



Audio/Visual Systems  
See Section 5.2

### 6.11.9 Projection Screens, Flat Screen Displays and Marker Boards

1. All conference rooms should accommodate computer based presentations. During the design phase the designer should consult with MSU ITC with regard to campus A/V standards.
2. Conference rooms designed for up to fifteen participants should consider the use of a flat screen display in lieu of projector and screen.
  - Connections should be provided at the table for laptop or tablet to display to the flat screen. Alternatively, a dedicated cable from the flat screen location can be provided if the table is close enough to the display.
3. Conference rooms designed for more than 15 participants may be too large for the use of a flat screen and should use a ceiling mounted projector with ceiling mounted motorized projection screen.
  - A. MSU ITC should be consulted for current standards for Audio /Visual equipment and the room should be designed around this equipment.
  - B. Ceiling mounted speakers and microphone should be considered.
  - C. Conference rooms with large windows should have motorized blinds.



4. If the conference room is large enough it may be necessary to install flat screen displays toward the rear of the room to augment the projection screen image.
5. Larger conference rooms should consider the installation of a speaker's podium housing computer, as well as lighting and Audio / Visual controls.
6. Conference rooms to be used for video conferencing must be fully designed for this purpose. With the assistance of the MSU Project Manager rooms to include video conferencing should be identified early in the design process. MSU ITC should be consulted for current campus standards regarding video conferencing equipment and controls. See information in this document regarding lighting, materials and finishes. In addition, current best practices such as IES "Fundamentals of Lighting for Videoconferencing" should be consulted.
7. Marker boards should be provided at the front wall of the conference room at minimum. Marker boards should be located so that they are not concealed when a projection screen is lowered. Consideration should be given to providing marker boards on side wall locations as well as the front wall.

#### **6.11.10 Acoustical Considerations**

1. Consider wall and ceiling treatments that improve intelligibility in the conference room.
  - A. The surface of the ceiling must be designed to accommodate the required acoustical properties of the room.
  - B. The area of the ceiling to be acoustical tile is a function of ceiling height.
  - C. A nine foot ceiling height typically requires that 40 to 50 percent of the total ceiling area to be acoustical tile.
  - D. A ceiling height of ten feet typically requires that 50 to 60 percent of the ceiling be acoustical tile and a ceiling height of 12 feet typically requires that 70 to 80 percent of the ceiling area be acoustical tile.
2. Ceiling tiles with a Noise Reduction Coefficient (NRC) of 0.65-0.85 and a minimum Sound Transmission Coefficient (STC) of 50 shall be used.
  - A. Overall noise criterion of less than 30 dBA is required, with the maximum sound level not to exceed 35 dBA.
  - B. In all conference rooms, use acoustically absorbent materials with an NRC rating of 0.85 or greater.

#### 6.11.11 Mechanical Systems

System components (fans, ductwork and diffusers) shall be selected to meet the sound criteria of NC 20 to NC 25.

Design the classroom HVAC systems to operate as a separate zone with controls to operate independently from other spaces within building.

1. Place air-conditioning registers along the perimeter of the room and the air returns in the center, front or rear of the room.
2. Select air devices for low velocity to minimize airflow noise in the room.
3. If the mechanical room is in close proximity to the classroom, evaluate the requirement for sound attenuators based upon the classroom NC criteria in Section 2.10, to reduce the mechanical system noise to meet these guidelines.
4. Isolate equipment mounted adjacent to and above a classroom from vibration.
5. Do not locate supply air or return air devices close to projection screens.

#### 6.11.12 Lighting Systems

Conference rooms, other than those designed for video conferencing, should have lighting measured at tabletop height of 40 to 50 foot-candles horizontal all across the seating area of the room and zero to eight foot-candles on the projections screen.

1. Conference rooms designed for videoconferencing should have:
  - A. Measured at tabletop height 40 foot-candles horizontal minimum all across the seating area of the room.
  - B. Measured from 40-inches to 80-inches above the finished floor 50 to 70 foot-candles vertical all across the seating area. This would be as you look towards the projection screen from the seating area.
  - C. From the presentation area looking towards the seating area a minimum of 40 horizontal foot-candles at the lectern work surface height.
  - D. Forty to 60 foot-candles vertical measured from 40-inch to 80-inch above the finished floor.
  - E. Zero to ten foot-candles on the projections screens.

- F. Wall wash on all but the projection screen wall should have a wash of 30 to 50 foot-candles.
  - Note to achieve the required vertical lighting goals the tabletop horizontal foot-candle lighting levels will typically be 40 percent higher than the achieved vertical foot-candle level. For instance, if there are 50 vertical foot-candles of light at a seating location there would typically be 70 horizontal foot-candles of light on the tabletop at that location.
- 2. Videoconference Capable rooms used for general meetings:
  - A. In most cases the extra lighting for videoconferencing is provided via separate dimmer or switched controls
  - B. Make sure that when these additional lighting fixtures are turned off that there is still a minimum of 40 horizontal foot-candles at tabletop height across the room.
- 3. The color temperature for all lighting fixtures should be the same. The color temperature target goal is 3200 degrees Kelvin. Color temperature in the range of 3000 to 3500 degrees Kelvin is acceptable as long as all the fixtures are the same.
- 4. In conference rooms equipped with standard recessed fluorescent luminaires and no down light fixtures the light fixtures within 6six feet of the projection screen should be on a separate switched circuit from the rest of the room lighting.
  - The fluorescent luminaires should have low surface brightness.
- 5. In videoconference capable conference rooms, asymmetrical fluorescent luminaires equipped with dimming ballasts should be provided. Asymmetrical luminaires direct the light away from the projection screens and provide adequate down light for general meetings and videoconferences.
  - A. A sufficient number of asymmetrical fluorescent luminaires shall be provided over the seating area to provide a range of 50 to 70 vertical foot-candles as you look towards the presentation area.
  - B. Use wall wash luminaires to light all but the presentation walls for videoconferences. Use wall wash fixtures to light markerboards.
- 6. Light Dimming capabilities are an integral part of all conference rooms and classrooms. In videoconference capable rooms the power requirements for the additional videoconference lighting often causes the rooms power requirements to exceed guidelines for “watts-per-square foot” ratings.



Information  
Technology  
See Section 5.1



### 6.11.13 Data and Telecom Requirements

All conference rooms are to have a minimum three data RJ-45 outlets and one analog audioconference telephone line outlet installed. These connections are to be installed in designated floor box locations in larger conference rooms and new construction or mounted on the front wall below the projection screen in smaller conference rooms or remodeled existing construction.

#### 6.11.14 Furniture

Consideration should be given, depending on the anticipated usage of the room, to the use of several tables which can be combined into a single larger table, thus allowing more freedom to use the room for small group work.

1. Conference tables should allow eye contact between participants on both sides of the table, there should be an unobstructed view of a presenter as well as of the projection screen or flat screen and the marker board on the presentation wall.
  - A. Use of a boat shaped table is encouraged.
  - B. Special care should be given to ensure proper legroom around and near any table legs.
  - C. An allowance of 30-36 inches of space per person at the table edge should be assumed.
  - D. Height under the edge of the table should be coordinated with the arm height of the selected chairs.
  - E. Chairs should have casters and arms.
2. Larger conference rooms may need to have counter space for setting up handouts or food. Consideration should be given to installation of a sink if the room will be used for meetings where food will be served.
3. If an instructor / presenter podium is provided it may be custom designed to match the finishes in the room, but if it is the design must accommodate the standard size and access requirements established by MSU ITC for instructor podiums.

#### 6.12 Food Service Facilities

The design of new or remodeled food service facilities is programmatically and technically complex. As such, any projects affecting food services must be closely coordinated and planned from inception with the Director of University Food Services.

Furniture, Fixtures  
and Equipment  
See Section 1.11

### 6.13 Athletic Facilities

The design of new or remodeled athletic facilities is programmatically and technically complex. As such any projects affecting athletic services must be closely coordinated and planned from inception with the following:

1. Project Manager
2. Director of Athletics
3. Event Coordinator
4. Director of Sports Facilities

### 6.14 Libraries

College and research libraries present increasingly complex challenges based on:

1. Providing and storing information in a multitude of formats and venues
2. Complex building use patterns – sometimes 24/7 access
3. Provide a variety of types and characters of space for student study. These spaces should vary from spaces for
  - A. quiet individual study
  - B. spaces for preparation of collaborative group presentation utilizing a variety of media.
4. Provision of traditional services and expanded services such as media production and presentation facilities
5. Students and faculty working in diverse collaborative ways
6. Partnerships with other campus services such as
  - A. information technology
  - B. writing help centers
  - C. centers for teaching excellence
7. Student and faculty expectations for reliable, pervasive technology
8. Shared space for seminars, lectures, art exhibits, concerts, and other campus functions
9. Open versus closed stacks
10. Remote storage
11. Automatic retrieval systems
12. Environmental concerns






### 6.14.1 Initial Considerations

Prior to beginning any work in any of the MSU Library spaces or starting work on a Library project the Design Team should meet with the MSU Project Team which must include the Dean of Libraries or his appointee. A Building Committee will be created for the project that will serve as the “client” throughout.

To begin the work of designing new library space, or remodeling existing library space, there are several important documents and resources that planners may wish to review. These include:

1. Institution and Library vision, mission and/or goals statements
2. Institution and Library strategic plans
3. Campus master plans
4. Campus history, culture and demographics
5. Library needs assessment and environmental scan
6. Documents from other Library projects
  - A. Concept documents
  - B. Building programs
  - C. Architectural plans
  - D. Construction budget
7. Standards
  - A. National, regional, and state standards and guidelines for library facilities
  - B. ADA (Americans with Disabilities Act) requirements <http://www.ada.gov/>
  - C. LEED (Leadership in Energy and Environmental Design) certification <http://www.usgbc.org/>
  - D. Tours of other libraries in construction or recently completed
  - E. Library building consultants <http://www.libraryconsultants.org>



Accessibility  
See Section 1.9

Sustainability  
See Section 1.6



### 6.14.2 Space Planning

Design Consultants must strive for nimble building and design programs that anticipate the evolving needs of the academic library community including planning for emerging technologies, evolving library collections and delivery systems, potential future expansion, changing user demographics, etc. As noted previously, there are many crucial factors to be considered in planning library space: Changing demographic trends (commuters, residential, distance learners, traditional, non-traditional, etc.)

1. Relationship between the Library and the advancement of the mission of the institution
2. Relationship between the Library and campus
3. Evolving curricula and pedagogical practices
4. Service delivery models
5. Changing role of the Library faculty and staff
6. Understanding the user (academic preparedness, learning preferences, etc.)
7. Expansive and disruptive technologies
8. Standards and guidelines
9. Design for users, collections and employees

### 6.14.3 Furniture, Fixtures and Equipment (FF&E)

When planning for furniture, fixtures and equipment (FF&E) it is important that planners consider the following factors:

1. Extensive consultation with Library administration and staff
2. Input from constituents / users, i.e. focus groups, charrettes or other patron input
3. Consideration given to bringing in a professional interior designer
4. Reusability (value consideration), flexibility (balance between order and chaos), portability (user control) and adaptability (recognition of constant change in the 21st century library)
5. Durability for 24/7 use in public areas. Check express warranties on products being considered
6. Conformance with the Library program: How well does the FF&E mesh with the desired project outcomes? The Library program (outcomes) should drive the FF&E, not the other way around.
7. Patron characteristics: Is the space designed to encourage extended usage, or in-and-out? Consider how the size of work surfaces, seating type, creature comforts such as lockers and furniture cubbies will influence length of stay.
8. Ergonomic and ADA considerations
9. Security issues juxtaposed with privacy interests. A security-based need which calls for open design will influence height of partitioning, design and degree of private study space, and private study area location and layout
10. Consideration of incorporating existing FF&E. Potential for refurbishmentAcoustics
11. Appropriate lighting for all spaces including task lighting. Balance of natural and artificial lighting



Furniture, Fixtures  
and Equipment  
See Section 1.11



Information  
Technology  
See Section 5.1

HVAC  
See Section 5.3

Accessibility  
See Section 1.9

Services <http://www.ala.org/ala/mgrps/divs/acrl/standards/>

12. Importance of the “sit test” for seating. Provision of a variety of postures / heights suggestive of differing seating types (lounged, seated, café height, standing height)
13. Technology management: wire management, adequacy to support desired hosting hardware. Powered vs. non powered workstations.
14. Availability of power for patron use. Ability to support user devices brought into the space. Flexibility of power provision (floor grid, raised floor).
15. Sustainability considerations and energy efficiency; meeting “Design for Environment” guidelines
16. Delineation between “collaborative” versus “individual” user furnishings
17. Efficacy of design: Will the actual use reflect the intended use? (Example: A small 4-person table may realistically seat only two).
18. Wayfinding and signage should be thoughtful and intentional

#### 6.14.4 Standards and Guidelines Issues

The Design Consultant in consultation with the Building Committee should seek out and examine standards and guidelines for Library planning, design and construction. Perhaps the most useful sections of these standards for designers of Library space include the following questions:

1. Does the Library provide well-planned, secure and sufficient space to meet the perceived needs of staff and users?
2. What are the perceptions of users regarding the provision of conducive study spaces, including a sufficient number of seats and varied types of seating?
3. Is there enough space for current Library collections and future growth of print resources?
4. Does the staff have sufficient workspace, and is it configured to promote efficient operations for current and future needs?
5. Does the Library’s signage facilitate use and navigation of the facilities?
6. Does the Library provide ergonomic workstations for its users and staff?
7. Are electrical and network wiring sufficient to meet the needs associated with electronic access?
8. Are building mechanical systems properly designed and maintained to control temperature and humidity at recommended levels?
9. Does the Library meet the requirements of the Americans with Disabilities Act?
10. Are facilities provided to distance learners considered in the context of the ACRL Guidelines for Distance Learning and Library?

### 6.15 Performance Venues

The programming, planning and design of performance venues for the MSU campus is a complex undertaking. Each space will be highly individual in terms of program and design.

Prior to beginning any work on a performance space, the Design Consultant should meet with the MSU Project Team which must include the Project Manager and the Dean of Arts and Architecture or an appointee. A Building Committee will be created for the project that will serve as the “client” throughout.

The common requirements will be:

1. Identification early in the programming stage of the projected needs and client groups for the space
2. Intensive investigation with the identified client groups in order to produce a program for the space including :
  - A. Budget
  - B. Types of performances to be accommodated
  - C. Numbers of seats
  - D. Technical and/or electronic components
3. Specialized consultants will most likely be required for elements of the design, such as:
  - A. Acoustics
  - B. Lighting
  - C. Seating systems
  - D. Audio / Visual
  - E. Stage specialties
4. In addition, the MEP consultants will have special considerations in the areas of structure and mechanical design pertaining to acoustics and noise suppression / isolation. The architect will also be required to provide specialized design and detailing in the areas of acoustics, sight lines, etc.

### 6.16 Offices

Many projects on the MSU campus will require the design or renovation of office space. Campus office space is occupied by a wide variety of users, including administrators, academic staff and faculty, research staff, and support staff. Most of these various office functions and uses will have common design elements.

Power and Lighting  
See Section 5.4

Information  
Technology  
See Section 5.1

HVAC  
See Section 5.3

#### 6.16.1 Office Design Criteria

The following are all issues that shall be included for the design of campus offices:  
Reference Appendix 6.16-1 Office Space Guidelines for size.

1. Basic office layout – closed offices, open offices, cubicles, etc.
2. Flexibility of space design for future reorganization / expansion
3. Departmental organization and requirement for access by students, staff, public, etc.
4. Relationship of offices for academic staff to teaching venues
5. Relationship of offices for research staff to their laboratories
6. Needs for related space such as conference / meeting rooms, filing areas, support spaces for supplies, copiers, break rooms, toilet rooms, etc.
7. Determine the requirement for acoustic separation between other office and adjacent spaces.
8. Special requirements for lighting and mechanical systems
9. Provision of natural light and natural ventilation
10. Integration of technology for computers, communication, presentations, etc.
11. Design issues related to new or existing furniture, millwork, etc.
12. Ergonomic design principles
13. In classroom buildings, generally classrooms will be designed on lower floors and offices designed on higher floors.

#### 6.16.2 General Office Construction

The following are general guidelines related to construction of campus offices:

1. Offices generally should have painted drywall walls, suspended acoustic ceilings and carpeted floors.
2. Office lighting should have a relatively low level of ambient lighting combined with task lighting at the desk.
3. Enclosed offices should have walls extending to the structure above for acoustic privacy.
4. Offices should have glazed lites in the doors or borrowed lites so that someone can see if the office is occupied if the door is closed.
5. Open office areas should have special attention paid to acoustics and lighting
  - A. Workstations should have acoustic partitions
  - B. Ceilings and, if possible, wall areas should be sound absorbing
  - C. Lighting should provide a uniform level of ambient light, with low surface brightness. Work stations should have task lighting.
  - D. Electrical wiring and both line voltage and low voltage should be accommodated within the work stations and fed from the floor if possible for work stations not abutting walls.



MSU Office Space  
Guidelines  
See Appendix 6.16-1

6. Any custom or built-in cabinetry must adhere to the requirements of Section 4.4 Carpentry Standards and Frame Wall Finishes.
7. Coat hooks or coat racks should be provided in every office.
8. Windows should be operable for natural ventilation and must be provided with operable interior blinds.

#### 6.17 Family Care Rooms

Recognizing the importance and benefits to families while on campus, MSU seeks to promote a family friendly environment in which to work and study. One suitable space for such purpose, a family care room, shall be included for all major renovations and for new construction, and is to be readily available during the time it is needed by faculty, staff or student.

MSU has two designated Family Care Rooms on campus and are located in 121 Hamilton Hall and 124 SUB. Both spaces are conducive of breast pumping and general care of infants. The following criteria shall be incorporated for the design of family care rooms, unless directed otherwise:

1. Size: 70 – 100 sf to accommodate the recommended furniture and equipment.
2. Location: Locate rooms in a safe, ADA-accessible area. If possible, the room should be located near an exterior door to provide access to designated parking spaces.
3. Privacy: Provide a user-operated, indicator dead bolt that displays an “occupied” message to discourage interruptions.
4. Sound Privacy: The room shall be designed to minimize the transmission of sound, both from room to adjacent space and from adjacent space to room, including but not limited to extending walls to structure above, sound attenuation within wall cavities, and sound-absorbing materials within the room.
5. Furniture: Provide a table or counter as a work surface for the pump and bottles to rest on in front of a task chair. Provide a comfortable, adjustable task chair with arms.
6. Electrical: At least one electrical outlet to power breast pumps. Refrigerators will not be provided in the space.
7. Plumbing: Provide a sink and faucet combination deep enough to wash bottles and pump parts.
8. Lighting: In addition to general lighting levels, provide task lighting over work areas and the ability to have lower lighting levels to create a calming setting.
9. HVAC: Temperature should be maintained year-round at a comfortable warm level. Locate individual thermostat in room for user control and thermal comfort.
10. Equipment: Provide an appropriate surface to allow for a baby-changing station. A wall-mounted changing station is preferable.
11. Accessories: Provide paper towel dispenser, coat hook and mirror.



**END OF SECTION 6.0**





## 7.0 HISTORIC BUILDINGS

### 7.1 Restoration

MSU has a breadth of historic campus buildings and structures that were built at the beginning of the 20th century. These structures and buildings represent a unique opportunity to strengthen the university's sense of place and tradition. Adaptive re-use planning will increase the development potential and importance of preserving existing campus historic structures. The LRCDP has set forth goals to identify, preserve and improve significant historic buildings and structures, as well as to set project budgets to accomplish quality project planning, design and construction through sustainable practices and include landscaping and infrastructure.

#### 7.1.2 Historic Preservation

MSU campus buildings that were built fifty years ago, or longer, are considered Heritage Sites and are regulated by the State Historic Preservation Office (SHPO). The university has a Heritage Building and Sites Policy which states that:

MSU's Historically significant properties will be continuously preserved and maintained to present a positive appearance to alumni, visitors, students, and the public, and to protect the enduring value of the properties. Removal of or major alteration to any historically significant properties designated or determined to be of historic significance, designated as a Heritage Property or listed on the National Register must be recommended by the University Facilities Planning Board and approved by the University President and/or appropriate governing agency when applicable.

The University will document historic or potentially historic properties consistent with the Montana Antiques Act or BOR policies in a professionally competent and responsible manner and in consultation with the SHPO prior to implementing significant modifications or alterations.

The University will consider national and state recognized historic preservation principles and guidelines (i.e. Secretary of Interior's Standards for Preservation) when implementing adaptive re-use or reuse of historically significant properties, Heritage Properties, or Registered Properties under ownership and control of the University in the planning and implementation of projects when possible and feasible.

Campus Planning, Design and Construction is responsible for coordinating University activities and projects with the SHPO and the state Architecture & Engineering Division as necessary or appropriate, and will be supported in these efforts by Facilities Services staff and UFPB.

A Heritage Assessment is required to be done on any building considered a Heritage Site prior to any restoration, renovation or addition is to be designed and built. The Project Manager shall inform the Design Consultant if the building will require this assessment.



LRCDP  
See Appendix 2.1-1

MSU Heritage  
Building and Sites  
Policy

## 7.2 Renovation Guideline Requirements

Renovation of Heritage buildings is often required to accommodate the growing population of students and faculty at MSU and the expansion of the university's mission. While the main objective is to not disturb the original architectural detailing of a Heritage Building there have been previous renovations that have not been sensitive enough to the original character of the building. When a renovation is undertaken, the Design Consultant, along with the Project Manager, shall review the original design and subsequent renovation renovations to identify areas that have been compromised and will require modification to bring the building back to its original design intent.

During the Design Development phase the designs for restoration or changes to the exterior of a building project must be presented to UFPB for approval.

The Design Consultant is encouraged to investigate use of the provisions of the International Existing Buildings Code, in conjunction with the IBC, and may provide additional flexibility in dealing with common constraints in renovating historic buildings.

### 7.2.1 Exterior Building Envelope

Heritage building renovations typically include upgrading the building's envelope, along with providing ADA accessibility. The style and detailing of upgraded materials is to match existing style and detailing but shall have upgraded technology. The following envelope items shall be taken into consideration when renovating any Heritage building:

1. Brick - Brick was the main building material used to construct the majority of Heritage buildings on campus.
  - A. Typical brick buildings 70 to 100 years old require full-scale repointing to ensure the building's longevity. Due to the advancement of brick and masonry grout design today's materials are much stronger than older materials.
  - B. The Design Consultant shall specify mortar design, similar to Cathedral Stone Projects Historic Pointing Mortar, to be of similar strengths as the original to ensure the mortar fails prior to the original brick.
  - C. Design Consultant shall specify the bricks to be made with similar strength characteristics as the original.
  - D. Brick sills and projected accents originally did not have protected top edges and joints, resulting in deterioration of mortar and brick. The Design Consultant along with the Project Manager shall investigate the appropriate means of protecting such sills and projections.

University Facilities  
Planning Board  
Website:

[www.montana.edu.us/committees/ufbp](http://www.montana.edu.us/committees/ufbp)

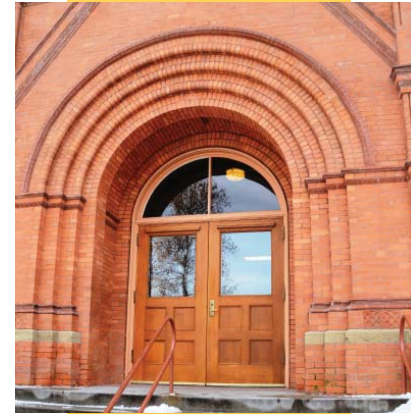
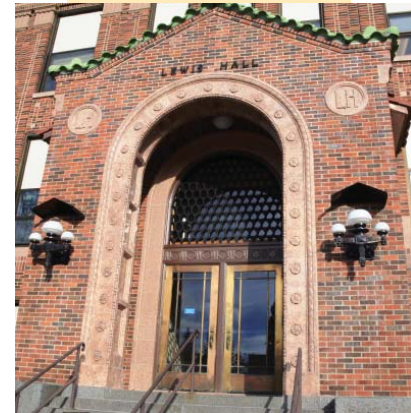


2. Campus restoration projects in the past have included work to grind joints out and install lead flashing to protect sill joints and projections. These details should be examined and included on all historic masonry restoration projects.
3. Concrete bricks used in some campus buildings, such as Linfield Hall, were a relatively new building material when implemented and do not have the strength of face brick of the same period. This has created an issue of repairing deteriorated sections.
  - A. Minor deteriorated sections may be parged with a minimal coat of historic patching mortar, such as Cathedral Stone Products Jahn M90, matching the existing color and texture. Such treatment shall be applied to individual bricks.
  - B. Major deteriorated sections must be removed completely and new concrete bricks installed.
  - C. The Design Consultant shall consult with manufacturers to determine readily available shapes and sizes to determine if replacement bricks will need to be custom ordered or over-sized and cut to fit.
4. Terra Cotta - Several of MSU's Heritage buildings have terra cotta decorative accents. When a building undergoes restoration great care should be given to restoring this terra cotta.
  - A. If the terra cotta is badly deteriorated molds should be taken and new terra cotta made to match the original.
  - B. In special cases other restoration methods may be considered such as the rebuilding and faux painting of terra cotta detail done on the south entry arch at Lewis Hall.
5. Windows - All historic renovations are to be done with wood windows made to mimic the original windows for sizes of rails, muntin size and configuration, and operation as closely as possible. Aluminum-clad wood windows and trim are acceptable, with exterior color to match the original as closely as possible.
  - A. New windows are to have insulated glass and meet all current standards for commercial class windows.
  - B. Typical window function of Heritage buildings is double-hung. There are some instances that the original function was sliding or awning.
  - C. Investigation to be done by the Design Consultant of Project Manager to determine the original exterior color of the windows.

6. Doors - If exterior entry doors are to be replaced, the new doors shall mimic original design and materials.
  - A. Wood doors will probably need to be custom made and should match the original doors in all dimensions and details.
  - B. Care should be taken to match the original wood species and cut.
  - C. New hardware may need to differ from the original in order to meet accessibility requirements, but the quality and finish should match the original.
  - D. Storefront doors to be replaced shall match the original frame, rail and stile dimensions, but may need to have updated ADA accessible hardware where required, and construction, including thermally broken frames
7. Roofing - Investigation needs to take place to determine historic roofing material and color.
  - A. Mimic historic material and color when possible, although project budget and material availability may affect the ability to restore original materials.
  - B. Investigation may determine the original roofing material contains hazardous components.
8. Wood siding and shingles – matching existing wood materials requires the same level of attention to investigate the original color and pattern.
  - Synthetic wood materials may be used in some instances, discuss potential placement of synthetic materials with the Project Manager.

### 7.2.2 Interior

Heritage building renovations typically include restoration or upgrading of interior surfaces, details, mechanical systems and lighting. The Design Consultant must determine the scope of the project and which parts of the building are to be renovated, then in consultation with the Project Manager determine the scope of possible restoration of original building materials and finishes. The following must be considered:







Department of the  
 Interior Historic  
 Preservation  
 Guidelines: [www.nps.gov/tps/standards.htm](http://www.nps.gov/tps/standards.htm)



1. Heritage Site designation applies to interiors as well as exteriors of buildings.
2. Although many university buildings that have Heritage Site designation never had extensive interior detailing or distinctive materials, the character of the building interior in an important aspect and must be respected.
  - A. In the Schematic Design phase, the Design Consultant should put together a plan that specifically addresses the design intent for maintaining historic elements and character in the project.
  - B. This plan must be approved by the Project Manager and the Building Committee.
  - C. This plan shall be submitted to SHPO by CPDC for review and comment as early in the design process as possible.
  - D. At the Design Development phase the design for interior public spaces shall be presented to the UFPB for approval.
3. Restoration of public spaces such as lobbies and corridors must take precedence over restoration of other interior spaces. In many cases original building materials are not readily available or may not be used due to restrictions on hazardous materials, but the following guidelines should be followed:
  - A. Where the function of the building area to be renovated has changed since the building was constructed or will change as part of the renovation, attention should be given to maintaining or mimicking the scale and character of spaces original to the building to as great an extent as possible.
  - B. Renovation should follow the original design intent in terms of materials, finishes and colors where possible.
  - C. Changes to lighting required to meet current energy codes must be sensitive not only to fixture type and style, but should attempt to achieve lighting color and intensity levels that are similar to the original.
  - D. New mechanical, sprinkler and plumbing systems installed in a Heritage building must be carefully designed and detailed so as to be as unobtrusive as possible.
  - E. Exposed piping and ductwork not original to the building are not acceptable.

### 7.2.3 Mid-Century Heritage Buildings

There are an increasing number of university buildings which were built in the 1950's and 1960's which come under the guidelines for Heritage buildings. These buildings are fundamentally different in design than buildings from the early decades of the 20th century and they sometimes have very different building materials and details. Renovation of these buildings requires a respect for the design principles that created them as well as an understanding of and appreciation for the construction detailing.

Typically these buildings utilize new construction materials that came into broad use after World War II, such as aluminum. They also utilize larger areas of glass in window systems that have little in common with individual wood frame windows in older buildings, and use traditional materials such as brick and terra cotta in new ways that reflect the fact that they are not load bearing. These building typically have flat roofs that were designed for the installation of sheet membranes instead of built-up tar and paper roofing.

The Design Consultant is encouraged to engage in a thorough examination of these design and construction issues and to provide leadership to the Building Committee in the importance of recognizing the differences inherent in a renovation project on any of these building.

### 7.3 Additions General Guideline Requirements

1. Additions to Heritage buildings are often required to meet the needs of changing curriculum and increased student and faculty population. There are two ways the Design Consultant may approach an addition to a Heritage building.
  - A. Additions shall be done in such a way as to mimic original design, but not confuse the new with original.
  - B. Additions shall be done with modern materials making a complete departure from the original, while using design elements such as massing and rhythm to remain sympathetic to the original design.
2. The U.S. Department of Interior has a guideline to be followed when adding onto Heritage buildings.
  - A. The Design Consultant shall be familiar with the requirements set forth in that document.
  - B. The requirements may or may not be achievable for restoration work, since true historic quality restoration may be outside of the MSU's project budget but the intent of these guidelines must be maintained where possible.
3. Investigation shall be done by the Design Consultant to determine the original colors and materials used on both the exterior and interior of the Heritage building.
  - A. A building addition, even an addition which makes a complete stylistic departure from the original, should be designed to coordinate comfortably with original colors and materials.
  - B. Previous renovations or additions to the building that may have departed from historic colors may need to be modified in order to create a harmonious overall result.

Interior spaces of new building additions must be of a piece with the exterior, although care should be taken in the design of the interior of additions that are a departure from the original on the exterior. The scale and modulation of space as a user moves from the space within the Heritage building to the space within the addition should be similar enough that the addition does not overwhelm or completely conflict with the original.

**END OF SECTION 7.**





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